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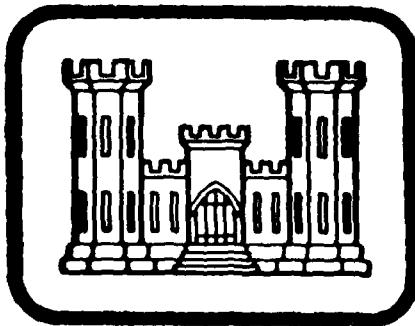
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DELAWARE RIVER BASIN  
GREEN VALLEY FARMS DAM  
MRS. ELEANOR M. REYNOLDS

NDI NO. PA-01101  
DER NO. 15-307

CHESTER COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM



PREPARED FOR  
DEPARTMENT OF THE ARMY  
Baltimore District, Corps of Engineers  
Baltimore, Maryland 21203

BY  
Berger Associates  
Harrisburg, Pennsylvania 17105  
Contract DACW31-81-C-0013

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## PREFACE

This report has been prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT  
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITIONS  
AND RECOMMENDATIONS

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Name of Dam: GREEN VALLEY FARMS DAM

State & State No.: PENNSYLVANIA, 15-307

County: CHESTER COUNTY

Stream: TROUT RUN

Date of Inspection: APRIL 10, 1981

Based on the visual inspection, past performance and the available engineering data, the dam and its appurtenant structures appear to be in fair condition.

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is high. These classifications indicate that the Spillway Design Flood (SDF) should be in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. The recommended SDF is one-half the PMF. The spillway capacity is adequate for passing only 14 percent of the PMF peak inflow without overtopping the dam. The spillway is considered to be inadequate.

The following recommendations are presented for immediate action by the owner:

1. That provisions be made to provide an adequate spillway capacity;
2. That the 12-inch CMP be cleared of obstructions on a regular basis;
3. That the upstream slope be protected from wave action erosion, and that brush and weed growth on the slope be controlled on a regular basis;
4. That the 4-inch drawdown valve be maintained and operated on a regular basis;

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GREEN VALLEY FARMS DAM

NDI NO. PA-01101

DER NO. 15-307

ELEANOR M. REYNOLDS

CHESTER COUNTY

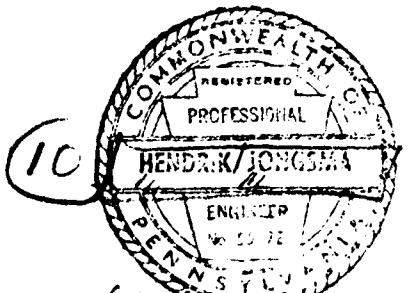
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5) That provisions be made for upstream closure of the drawdown pipe in case of an emergency;  
6) That the fence across the spillway discharge channel be relocated to preclude obstruction of the flow;  
7) That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall; and  
8) That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

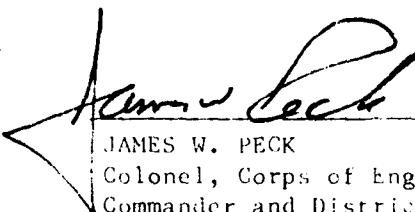
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APPROVED BY:

BERGER ASSOCIATES, INC.  
HARRISBURG, PENNSYLVANIA

DATE: June 5, 1981

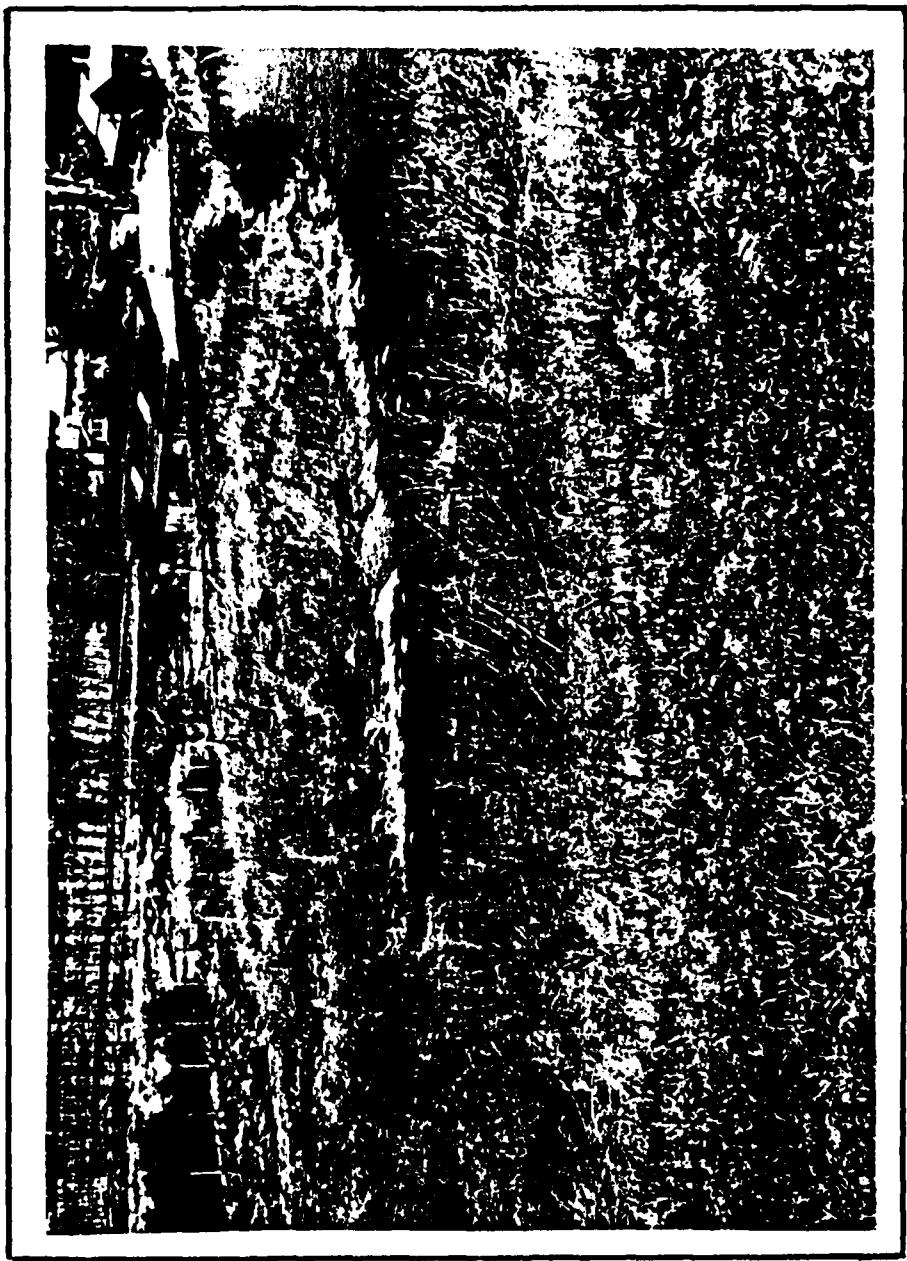


  
JAMES W. PECK  
Colonel, Corps of Engineers  
Commander and District Engineer

DATE: 17 June 1981

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National Dam Inspection Program.  
Green Valley Farms Dam (NDI Number  
PA-01101, DER Number 15-307), REDACTED  
Delaware River Basin, Chester County,  
Pennsylvania. Phase I Inspection Report



OVERVIEW

GREEN VALLEY FARMS DAM

Photograph No. 1

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PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

GREEN VALLEY FARMS DAM

NDI NO. PA-01101  
DER NO. 15-307

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

A. Authority

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspections of dams throughout the United States.

B. Purpose

The purpose of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

Note: A design drawing for the spillway (Plate III, Appendix E) indicates a spillway elevation (normal pool) of 121.0. It was estimated from the U.S.G.S. Quadrangle sheet that normal pool elevation is 330. Elevation 330 was used as the invert elevation of the overflow pipe in the spillway.

Green Valley Farms Dam is an earthfill structure constructed along a curved centerline with two tangent sections near the abutments. The length of the embankment is about 680 feet and its maximum height is about 23 feet. Several barns and a silo are located immediately downstream of the toe of the embankment. An earth lined spillway is located in the left abutment. The original spillway was modified after construction by placement of a 12-inch diameter CMP on the crest and placement of about 2.5 feet of fill on the crest. This was done to gain vehicle access across the spillway. Inflow now discharges through the 12-inch diameter CMP until the water level reaches the crest of the raised spillway elevation. The spillway was constructed as a grass lined channel. The reservoir can be drained through a four inch line which has a downstream valve control. A toe drain was installed after completion of the dam to intercept any subsurface seepage from the reservoir. Several lagoons are located downstream of the dam.

B. Location: Newgarden Township, Chester County  
 U.S.G.S. Quadrangle - West Grove, Pa.  
 Latitude 39°-49.4', Longitude 75°-46.0'  
 Appendix E, Plates I & II

C. Size Classification: Small: Height - 23 feet  
 Storage - 80 acre-feet

D. Hazard Classification: High (refer to Section 3.1.E.)

E. Ownership: Mrs. Eleanor M. Reynolds  
 P.O. Box 506  
 Avondale, PA 19311

F. Purpose: Farm use and fire protection

G. Design and Construction History

Design drawings for the embankment do not exist. Construction of the dam was started in 1963. Material excavated from the reservoir was used in the construction of the embankment. After construction started, Geo-Technical Services, Harrisburg, Pennsylvania, was requested to survey the area and to design a spillway. Plate III, Appendix E shows the results of this survey and the spillway layout.

A toe drain was installed in 1970 or 1971 to intercept sub-surface water and thus prevent it from entering the downstream lagoons.

H. Normal Operating Procedures

There are no operating procedures at the present time. All inflow is discharged through the 12-inch CMP and the earth spillway. The valve on the four inch drawdown line has not been operated in at least the past eight years.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

|                           |     |
|---------------------------|-----|
| From files:               | .23 |
| Computed for this report: | .21 |
| Use:                      | .21 |

B. Discharge at Dam Site (cubic feet per second)  
 See Appendix D for hydraulic calculations.

|  |     |
|--|-----|
| Maximum known flood (estimated from gage records of nearby Middle Branch White Clay Creek) | 145 |
|--|-----|

|  |                        |
|--|------------------------|
| Outlet works at low pool level Elev. 330<br>(spillway crest - 4-inch pipe) | 1.1                    |
| Outlet works at low pool Elev. 315   | .5                     |
| Spillway capacity at pool Elev. 333.1<br>(low point of dam)                | 42                     |
| <b>C. <u>Elevation</u> (feet above mean sea level)</b>                     |                        |
| Top of dam (low point)   | 333.1                  |
| Top of dam (design crest)  | 333.0                  |
| Spillway crest   | 332.4                  |
| 12-inch CMP invert   | 330.0                  |
| Upstream outlet invert (approximate)                                       | 309.4                  |
| Streambed at downstream toe  | 310                    |
| <b>D. <u>Reservoir</u> (miles)</b>   |                        |
| Length of normal pool (Elev. 330.0)  | .2                     |
| Length of maximum pool (Elev. 333.1)                                       | .2                     |
| <b>E. <u>Storage</u> (acre-feet)</b>                                       |                        |
| Spillway crest (Elev. 330)   | 55                     |
| Top of dam (Elev. 333.1)   | 80                     |
| <b>F. <u>Reservoir Surface</u> (acres)</b>                                 |                        |
| Spillway crest (Elev. 330.0 - 12-inch<br>CMP invert)                       | 7.3                    |
| Top of dam (Elev. 333.1)   | 9.0                    |
| <b>G. <u>Dam</u></b>   |                        |
| Refer to Plates A-I, II and III in Appendix A for plan and<br>section.     |                        |
| Type:  | Homogeneous earthfill. |
| Length:  | 680 feet.              |
| Height:  | 23 feet.               |

Top Width: Design - 12 feet; Survey - 14 feet.

| Side Slopes: | <u>Design</u> | <u>Surveyed</u> |
|--------------|---------------|-----------------|
| Upstream     | 3H to 1V      | Varies          |
| Downstream   | 3H to 1V      | 3.8H to 1V      |

Zoning: None.

Cutoff: Unknown.

Grouting: None.

H. Outlet Facilities

Type: 4-inch pipe through embankment.

Closure: Valve at downstream toe.

Location: Near center of dam.

I. Spillway

Type: Uncontrolled, sod lined, broad crested weir and a 12-inch diameter CMP.

Length  
of Weir: 48 feet.

Crest  
Elevation: 330 (CMP); 332.4 (Emergency)

J. Regulating Outlets

See Section 1.3.H. above.

## SECTION 2 - ENGINEERING DATA

### 2.1 DESIGN

Engineering data for Green Valley Farms Dam is limited. Mr. Yachin of Geo-Technical Services, Harrisburg, Pennsylvania, stated that his company did not get involved with the project until the embankment had been partially constructed. A drawing prepared by this company indicates an area capacity curve. The spillway crest was designed to be 3 feet below the crest of the dam with a bottom width of 40 feet. The size of the dam did not require a permit from the Pennsylvania Department of Environmental Resources (PennDER).

### 2.2 CONSTRUCTION

There are no records of construction. The construction period was 1963 and 1964. The name of the contractor is unknown.

### 2.3 OPERATION

Records of operation are not maintained by the owner.

### 2.4 EVALUATION

#### A. Availability

The only available drawing (Plate III, Appendix E) was obtained from Geo-Technical Services. A representative of the owner stated that some records perhaps could be made available; however, a considerable effort would be required to locate these records.

#### B. Adequacy

Because of the lack of engineering and construction data, the assessment of the dam is based on the results of the visual inspection.

#### C. Operating Records

Operating records have not been maintained.

#### D. Post Construction Changes

The dam is located on an experimental farm. Several lagoons were constructed downstream from the dam for special treatment of cow manure. In 1970 or 1971, six inch diameter drains were installed to reduce the flow of subsurface water from the dam area into these lagoons. The pipes discharge the collected drainage into a well from which the water is piped to an area downstream from the lagoons. The system diverted about 70,000 to 100,000 gallons per day after its installation.

Farmland is located to the southwest of the left abutment. The owner's representative stated that to provide access to this land, a twelve inch pipe was placed in the spillway and fill was placed over the pipe. While this action provided a dry access road to the farmland, it also reduced the capacity of the spillway.

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS

#### A. General

The general appearance of Green Valley Farms Dam is fair. The upstream slope has been eroded by wave action and has a considerable amount of high weeds and some brush. The crest of the dam and the downstream slope are in good condition. The spillway appears to be small. There were no signs of structural instability or seepage.

The visual inspection check list and sketches of the general plan and profile of the dam, as surveyed during the inspection, are presented in Appendix A of this report. Photographs of the facilities taken during the inspection are reproduced in Appendix C.

Representatives of the owner accompanied the inspectors on the day of inspection. Due to the lack of formal information, this report is based partially on information received in the field. Files concerning this dam are in the owner's office but are unorganized and difficult to locate.

#### B. Embankment

The centerline of the dam was constructed along a curved alignment in its center section with tangents at both abutments (Plate A-I, Appendix A). The crest averages about 14 feet in width and has a good grass mat cover. The typical cross section (Plate A-III, Appendix A) indicates that the crest is sloped down toward the downstream side. The upstream slope has been eroded by wave action over at least half its length causing a nearly vertical three foot high embankment above normal pool level (Photograph No. 5). Weed growth and some brush are located on this slope.

The downstream slope varies over the length of the embankment. The right end of the embankment has a slope of about 2.5H to 1V. Near the center of the dam at station 5+30 (Plate A-III) the average slope is 3.8H to 1V. The slope has a good grass mat cover. There were no signs of sloughage or seepage. A 30-inch diameter observation well is located near the downstream toe. Two drainpipes, estimated at 6-inch diameter, enter this well. One drain was active. Another pipe discharges the collected water from the well to the downstream area.

#### C. Appurtenant Structures

The spillway is located in the left abutment and consists of a grassed earth channel. The crest of this weir is only .7 foot below the low point in the dam crest profile (Plate A-II). A 12-inch CMP located in the spillway channel functions as the principal spillway. This pipe

is partially obstructed by weeds at the upstream end (Photograph No. 11) and with rocks at the downstream end. The owner's representatives stated that in order to provide access across the original spillway to the adjacent farmland, this 12-inch pipe was placed in the original spillway channel. Fill was placed over the pipe, thus providing a dry access road. The spillway channel has eroded at the outlet end of the pipe and beyond that point (Photograph No. 12). Further erosion will occur if preventative measures are not taken. A wire fence crosses the spillway outlet and if clogged, could reduce the discharge capacity of the spillway.

A four inch drawdown pipe is located near the center of the dam. This pipe has a downstream valve control through a 6-inch vertical standpipe. The valve has not been operated in at least eight years. The outlet of this drawdown line could not be located and is apparently buried.

#### D. Reservoir Area

The slopes around the reservoir are flat to moderate and consist mostly of farmlands. The banks are stable.

#### E. Downstream Channel

The immediate downstream channel of the spillway is a new channel created when the spillway was constructed. The stream runs through farm fields. Several barns and one house are located immediately downstream of the dam near the right abutment. Several lagoons, used for experimental farming, are located 600 to 700 feet downstream of the dam. An industry and a railroad are located 2,000 feet downstream in the floodplain. A potential hazard to loss of life exists downstream if the dam fails. The possible loss of life is estimated to be more than a few. The hazard category is therefore considered to be "High."

#### 3.2 EVALUATION

The overall visual evaluation of the facilities indicates that Green Valley Farms is in fair condition. Although the crest and the downstream slope have a good appearance, the upstream slope should be protected against wave action and the weeds and brush should be removed. The spillway capacity has been reduced to permit a dry access road to farmland. The 12-inch outlet pipe in the spillway should be cleared of obstructions and the discharge channel should be protected from erosion. The fence across the spillway should be relocated.

## SECTION 4 - OPERATIONAL PROCEDURES

### 4.1 PROCEDURES

Green Valley Farms Dam was constructed for farm use and as a water supply for fire protection. Maintenance procedures are limited and there are no operational procedures for the opening and maintenance of the four inch drawdown valve.

### 4.2 MAINTENANCE OF EMBANKMENT

The inspection indicates that the crest and downstream slope of the embankment has a good grass mat and appears to be mowed and maintained regularly. The upstream slope is eroding by wave action and has a growth of weeds and some brush.

### 4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facility is a four inch drawdown valve on the downstream slope. This valve has not been maintained, greased or operated for at least eight years. The entrance to the 12-inch pipe on the spillway is not maintained on a regular basis.

### 4.4 WARNING SYSTEM

There is no formally organized surveillance and downstream warning system in existence at the present time.

### 4.5 EVALUATION

The operational procedures for Green Valley Farms Dam are minimal. It is recommended that a program be developed for maintenance of the upstream slope and the regular operation of the drawdown valve. The spillway outlet discharge pipe should also be maintained. A formal surveillance plan and downstream warning system should be developed for implementation during periods of heavy or prolonged precipitation.

## SECTION 5 - HYDROLOGY/HYDRAULICS

### 5.1 EVALUATION OF FEATURES

#### A. Design Data

No hydrologic and hydraulic analyses were available from PennDER for Green Valley Farms Dam. Drawings of proposed modification obtained from the owner's engineer include an area-capacity curve and indicate a 40 foot wide trapezoidal spillway with an elevation 3 feet below the crest of the dam. This spillway had a design capacity of 345 cfs.

#### B. Experience Data

There are no records of flood levels at Green Valley Farms Dam. Based on records of the U.S.G.S. stream gage on Middle Branch White Clay Creek at nearby Landenberg, Pennsylvania, the maximum inflow to Green Valley Farms Dam is estimated to have been 145 cfs. This flood, occurring in June 1972, was passed without reported damage.

#### C. Visual Observations

It was noted that the 12-inch CMP spillway pipe was partially obstructed by rocks and weeds. No other conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily during a flood event until the dam is overtopped.

#### D. Overtopping Potential

Green Valley Farms Dam has a total storage capacity of 80 acre-feet and an overall height of 23 feet, both referenced to the top of the dam. These dimensions indicate a size classification of "Small," and a hazard classification of "High" (see Section 3.1.E.).

The recommended Spillway Design Flood (SDF) for a dam having the above classifications is in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. Because of the size, the recommended SDF is one-half the PMF. For this dam, the SDF peak inflow is 411 cfs (see Appendix D for HEC-1 inflow computations).

Comparison of the estimated SDF peak inflow of 411 cfs with the estimated spillway discharge capacity of 42 cfs indicates that a potential for overtopping of Green Valley Farms Dam exists.

An estimate of the storage effect of the reservoir and routing of the computed inflow hydrograph through the reservoir shows that this dam does not have the necessary storage available to pass the SDF without overtopping. The spillway-reservoir system can pass a flood event equal to 14% of a PMF.

E. Spillway Adequacy

Calculations show that the spillway discharge capacity and reservoir storage capacity combine to handle 14% of the PMF (refer to Appendix D).

Since the spillway discharge and reservoir storage capacity cannot pass one-half of the PMF, and since overtopping of about one-half foot, caused by one-half of the PMF, is not expected to cause a breach of this dam, the spillway is considered to be inadequate, but not seriously inadequate.

If the spillway would be reconstructed to its design dimensions (40 foot bottom width at elevation 330 with 2.0:1 side slopes), the project would be able to pass 83% of the PMF without overtopping and would be considered adequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

## SECTION 6 - STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### A. Visual Observations

##### 1. Embankment

The visual inspection of Green Valley Farms Dam did not detect any signs of seepage through the embankment. A drainage system at the toe was installed in 1970 or 1971 to intercept subsurface flow toward lagoons located further downstream. This system was installed for the protection of the lagoons. The stability of the dam was not threatened. The downstream slope of 3.8H to 1V is considered adequate for this type of embankment and there were no signs of sloughs or surface cracks. The upstream slope, although apparently stable, is unprotected and has been eroded by wave action.

##### 2. Appurtenant Structures

The outlet of the 12-inch CMP and the earth spillway have been eroded by normal discharge. Although the condition is not critical at this time, further erosion could endanger the safety of the structure.

#### B. Design and Construction Data

Design and construction data for the embankment do not exist.

#### C. Operating Records

Operating records for this dam have not been maintained by the owner.

#### D. Post Construction Changes

The toe drain system was installed after completion of the embankment. This system was not required for an uncontrolled seepage condition and should not affect the stability of the structure. It is apparent from the visual inspection that the original spillway has been modified, reducing its discharge capacity. This condition will effect the chance of overtopping the dam and, therefore, the stability of the structure.

#### E. Seismic Stability

This dam is located in Seismic Zone 1, and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

## SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

### 7.1 DAM ASSESSMENT

#### A. Safety

The visual inspection indicates that Green Valley Farms Dam is in fair condition. Engineering design and construction data are not available for review. One drawing indicates the design dimensions of the spillway. The upstream slope and the spillway discharge channel should be protected against further erosion.

In accordance with the Corps of Engineers' evaluation guidelines, the size classification of this dam is small and the hazard classification is high. These classifications indicate that the Spillway Design Flood (SDF) should be in the range of one-half the Probable Maximum Flood (PMF) to the full PMF. The recommended SDF for this structure is one-half the PMF.

The hydrologic and hydraulic computations indicate that the combination of storage capacity and the discharge capacity of the spillway is adequate for passing only 14 percent of the PMF. The spillway is therefore considered to be inadequate.

#### B. Adequacy of Information

The visual inspection is considered to be sufficiently adequate for making a reasonable assessment of this dam.

#### C. Urgency

The recommendations presented below should be implemented immediately.

#### D. Additional Studies

Additional studies are not required at this time if the recommendations are implemented immediately.

### 7.2 RECOMMENDATIONS

In order to assure the continued satisfactory operation of this dam, the following recommendations are presented for immediate implementation by the owner:

1. That provisions be made to provide an adequate spillway capacity.
2. That the 12-inch CMP in the spillway be cleared of obstructions on a regular basis.

3. That the upstream slope be protected from wave action erosion, and that brush and weed growth on the slope be controlled on a regular basis.
4. That the 4-inch drawdown valve be maintained and operated on a regular basis.
5. That provisions be made for upstream closure of the drawdown pipe in case of an emergency.
6. That the fence across the spillway discharge channel be relocated to preclude obstruction of the flow.
7. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.
8. That an operation and maintenance manual be prepared for guidance in the operation of the dam during normal and emergency conditions, and that a schedule be developed for the annual inspection of the dam and its appurtenant structures.

APPENDIX A  
CHECK LIST OF VISUAL INSPECTION REPORT

APPENDIX A

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER #15-307

NDI NO. PA-01101

NAME OF DAM Green Valley Farms Dam HAZARD CATEGORY High

TYPE OF DAM Earthfill

LOCATION Newgarden TOWNSHIP Chester COUNTY, PENNSYLVANIA

INSPECTION DATE 4/10/81 WEATHER Sunny, warm TEMPERATURE 60's

INSPECTORS: R. Houseal (Recorder) OWNER'S REPRESENTATIVE(s):

H. Jongsma Jackie

R. Shireman Dominic

A. Bartlett

NORMAL POOL ELEVATION: 330 (U.S.G.S.) AT TIME OF INSPECTION: 330.2

BREAST ELEVATION: 333.1 (Survey) POOL ELEVATION:

330.0 - 12-inch pipe

SPILLWAY ELEVATION: 332.4 - emergency TAILWATER ELEVATION:

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS:

Upstream slope eroded to near vertical.

NDI NO. PA-01101

VISUAL INSPECTION  
EMBANKMENT

| OBSERVATIONS AND REMARKS                                 |   |
|--|---|
| A. SURFACE CRACKS  | None observed.  |
| B. UNUSUAL MOVEMENT BEYOND TOE                           | None observed.  |
| C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES | None observed on downstream slope. Upstream slope eroded to near vertical for a depth of 3±' then flattens in the upstream direction. |
| D. ALIGNMENT OF CREST:<br>HORIZONTAL:<br>VERTICAL:       | Horizontal Alignment - Curved.<br>Vertical - Refer to Profile - Plate No. A-II.   |
| E. RIPRAP FAILURES                                       | No riprap.  |
| F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY            | Good.   |
| G. SEEPAGE   | None observed on downstream slope or at toe of embankment.  |
| H. DRAINS  | 30" vertical pipe near toe of slope. 6" pipes discharging into this pipe. 6" pipe at 11.5' below top of 30" pipe.                     |
| J. GAGES & RECORDER                                      | Observation wells for water quality sampling.   |
| K. COVER (GROWTH)  | Field grass over top and downstream slope. A few clumps of brush at crest on upstream side.   |

VISUAL INSPECTION  
OUTLET WORKS

| OBSERVATIONS AND REMARKS |  |
|--------------------------|--|
| A. INTAKE STRUCTURE      | None.  |
| B. OUTLET STRUCTURE      | 4" pipe with valve located in a 6" vertical pipe on downstream slope. Water standing in this pipe to about 7 feet below top of pipe. |
| C. OUTLET CHANNEL        | Not located. Note: drawdown line indicated to be 4" by Geotechnical Services. Owner's representative reported line to be 6".         |
| D. GATES                 | 4" valve.  |
| E. EMERGENCY GATE        | 4" drawdown line with valve on downstream slope.   |
| F. OPERATION & CONTROL   | No records.  |
| G. BRIDGE (ACCESS)       | N/A.   |

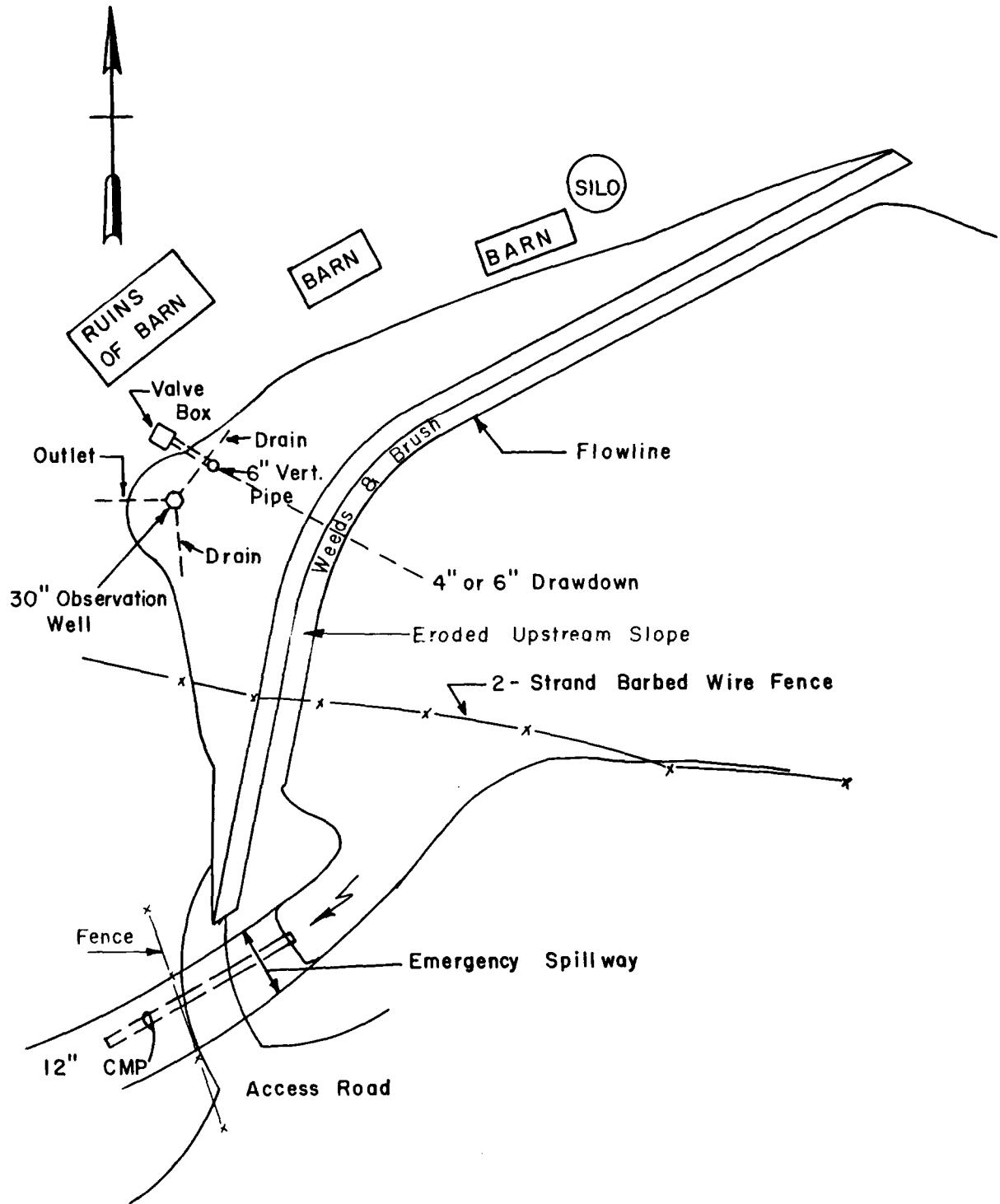
NDI NO. PA-01101

VISUAL INSPECTION  
SPILLWAY

| OBSERVATIONS AND REMARKS  |  |
|---|--|
| A. APPROACH CHANNEL   | Water discharges from reservoir through 12" horizontal metal pipe located at left side of reservoir in the spillway. |
| B. WEIR:<br>Crest Condition<br>Cracks<br>Deterioration<br>Foundation<br>Abutments | Spillway created at left end of embankment.  |
| C. DISCHARGE CHANNEL:<br>Lining<br>Cracks<br>Stilling Basin                       | Natural drainage swale, some rocks. No stilling basin.   |
| D. BRIDGE & PIERS   | None.  |
| E. GATES & OPERATION EQUIPMENT  | None.  |
| F. CONTROL & HISTORY  | None.  |

VISUAL INSPECTION

| OBSERVATIONS AND REMARKS  |                                    |
|---------------------------|------------------------------------|
| <u>INSTRUMENTATION</u>    |                                    |
| Monumentation             | None.                              |
| Observation Wells         | Yes.                               |
| Weirs                     | None.                              |
| Piezometers               | None.                              |
| Staff Gauge               | None.                              |
| Other                     | None.                              |
| <u>RESERVOIR</u>          |                                    |
| Slopes                    | Moderate.                          |
| Sedimentation             | Unknown.                           |
| Watershed Description     | Farmland.                          |
| <u>DOWNSTREAM CHANNEL</u> |                                    |
| Condition                 | Fields.                            |
| Slopes                    | Moderate.                          |
| Approximate Population    | More than a few.                   |
| No. Homes                 | One house and industry (Mushroom). |



GREEN VALLEY FARMS DAM  
PA-01101  
INSPECTION SURVEY  
PLATE A-I

SURVEYED 4-10-81

340

335

330

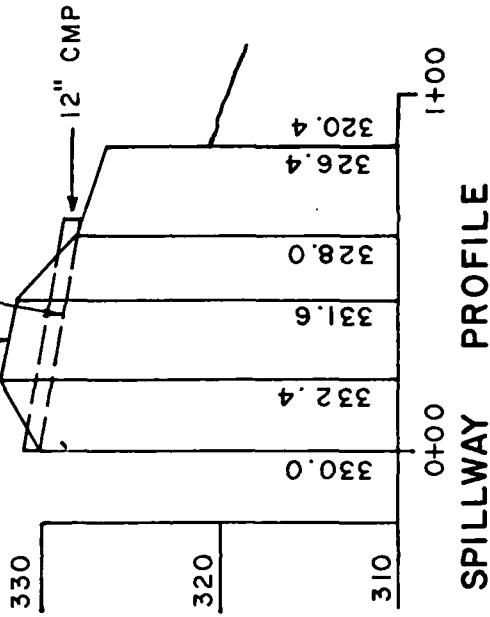
333.9  
332.6  
332.5  
333.0  
335.8

333.9  
333.7  
333.8  
333.8  
333.7  
333.9  
334.1  
333.9  
333.7  
333.7  
333.9  
333.7  
333.1  
333.2  
333.1  
333.1  
333.5  
334.1  
334.3  
334.5  
334.3  
334.1  
335.0  
335.4

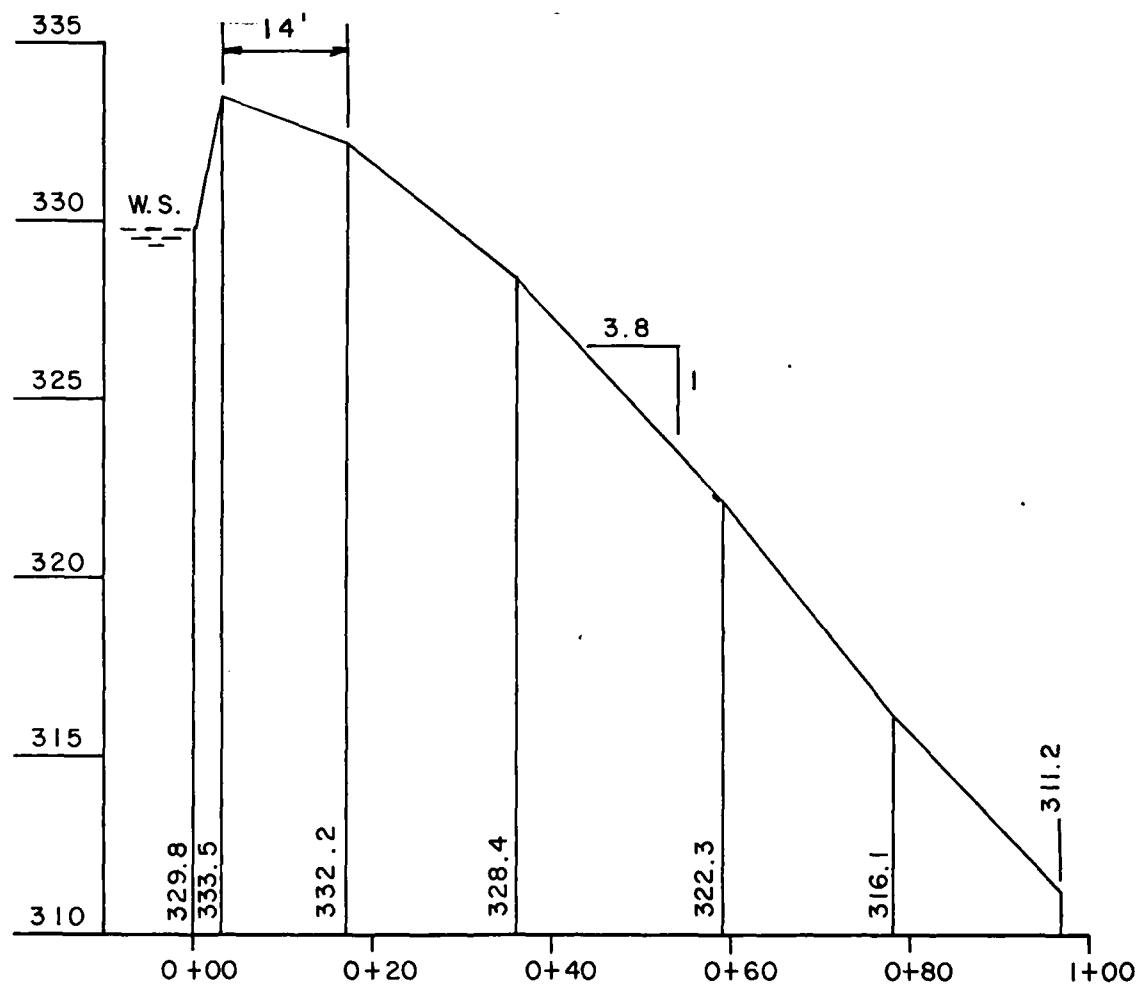
EMBANKMENT PROFILE

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00

BACKFILL APPROXIMATE SPILLWAY DESIGN PROFILE



SPILLWAY PROFILE



GREEN VALLEY FARMS DAM  
PA-01101  
INSPECTION SURVEY  
PLATE A-III

SURVEYED 4-10-81

**APPENDIX B**  
**CHECK LIST OF ENGINEERING DATA**

**APPENDIX B**

CHECK LIST  
ENGINEERING DATA

PA DER # 15-307

NDI NO. PA- 01101

NAME OF DAM Green Valley Farms Dam

| ITEM  | REMARKS   |
|---|---|
| AS-BUILT DRAWINGS   | None.   |
| REGIONAL VICINITY MAP   | U.S.G.S. Quadrangle - West' Grove, Pa.<br>See Plate II, Appendix E  |
| CONSTRUCTION HISTORY  | Constructed in 1963 and 1964. Spillway designed by Geo-Technical Services, Harrisburg, Pennsylvania, after embankment construction had started. |
| GENERAL PLAN OF DAM   | Plate III, Appendix E.  |
| TYPICAL SECTIONS OF DAM   | Plate A-III, Appendix A.  |
| OUTLETS:<br>PLAN<br>DETAILS<br>CONSTRAINTS<br>DISCHARGE RATINGS | No plans. A 4 or 6 inch drawdown line with downstream control. Outlet not located.  |

ENGINEERING DATA

| ITEM  | REMARKS              |
|---|----------------------|
| RAINFALL &<br>RESERVOIR RECORDS   | No records.          |
| DESIGN REPORTS  | No reports.          |
| GEOLOGY REPORTS   | None.                |
| DESIGN COMPUTATIONS:<br>HYDROLOGY &<br>HYDRAULICS<br>DAM STABILITY<br>SEEPAGE STUDIES | None.                |
| MATERIALS INVESTIGATIONS:<br>BORING RECORDS<br>LABORATORY<br>FIELD                    | No records.          |
| POST CONSTRUCTION<br>SURVEYS OF DAM   | None.                |
| BORROW SOURCES  | From reservoir area. |
|   |                      |

ENGINEERING DATA

| ITEM   | REMARKS   |
|--|---|
| MONITORING SYSTEMS   | Observation well near downstream toe. No records or drawings. |
| MODIFICATIONS  | No records. See Section 3 for unrecorded modifications.       |
| HIGH POOL RECORDS  | No records.   |
| POST CONSTRUCTION<br>ENGINEERING STUDIES<br>& REPORTS                    | None.   |
| PRIOR ACCIDENTS OR<br>FAILURE OF DAM<br><br>Description:<br><br>Reports: | None.   |
| MAINTENANCE &<br>OPERATION RECORDS                                       | No records.   |
| SPILLWAY PLAN, SECTIONS<br>AND DETAILS                                   | Plate III, Appendix E. No records of modification.            |

NDI NO. PA- 01101

ENGINEERING DATA

| ITEM  | REMARKS     |
|---|-------------|
| OPERATING EQUIPMENT,<br>PLANS & DETAILS       | No plans.   |
| CONSTRUCTION RECORDS                          | No records. |
| PREVIOUS INSPECTION<br>REPORTS & DEFICIENCIES | None.       |
| MISCELLANEOUS                                 |             |

NDI NO. PA-01101

CHECK LIST  
HYDROLOGIC AND HYDRAULIC  
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Farmland

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 330.0 Acre-Feet 55  
TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 333.1 Acre-Feet 80  
MAXIMUM DESIGN POOL: Elev. 333.0  
TOP DAM: Elev. 333.1

SPILLWAY:

- a. Elevation 330
- b. Type Sod lined, broad crested weir with 12" CMP
- c. Width 48'
- d. Length pipe 60' long
- e. Location Spillover left abutment
- f. Number and Type of Gates none

OUTLET WORKS:

- a. Type 4" pipe with valve
- b. Location valve pit at downstream toe
- c. Entrance inverts 309.4
- d. Exit inverts 309.4
- e. Emergency drawdown facilities 4" pipe

HYDROMETEOROLOGICAL GAGES:

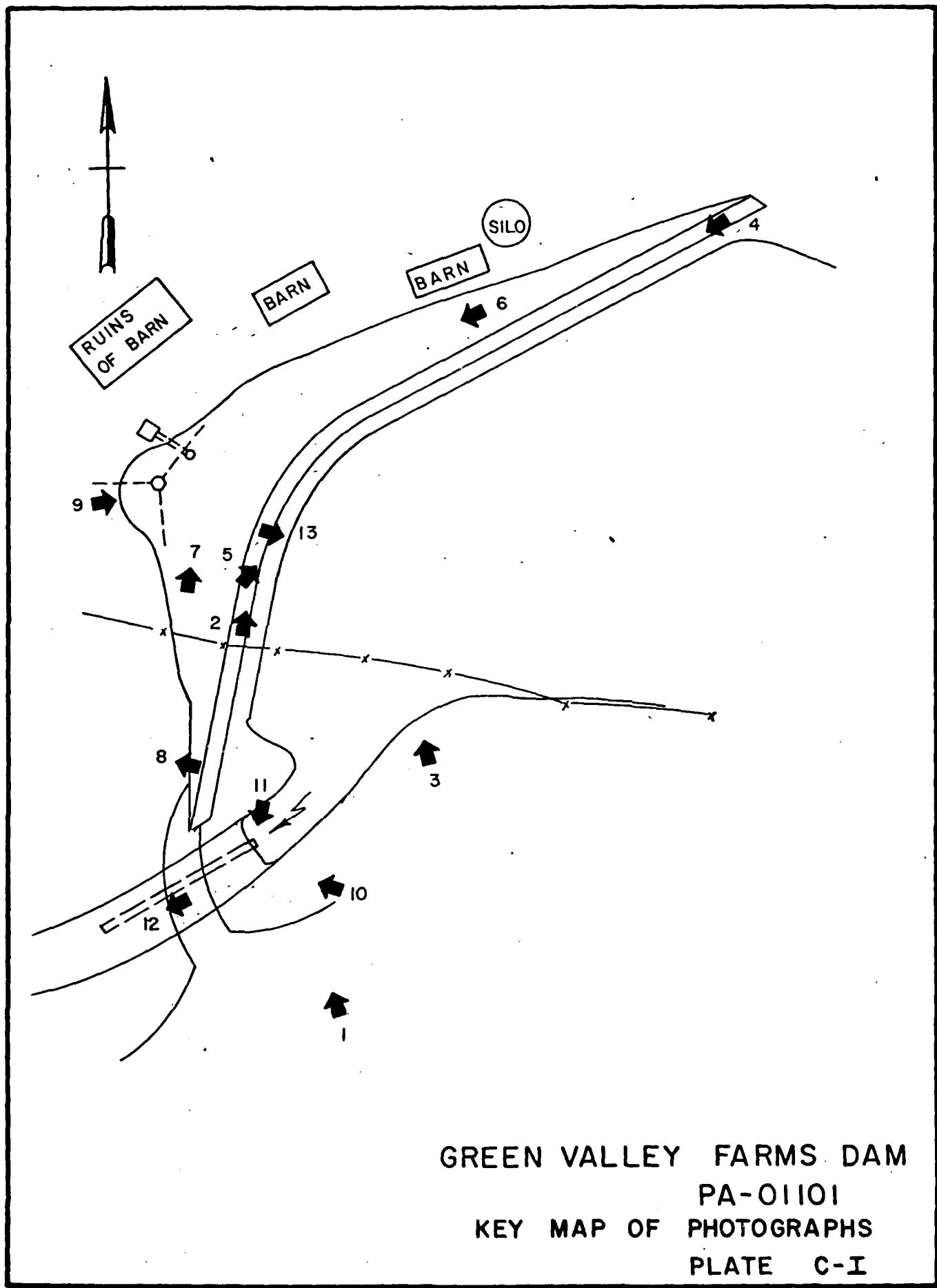
- a. Type none
- b. Location
- c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 42 cfs

**APPENDIX C**

**PHOTOGRAPHS**

**APPENDIX C**



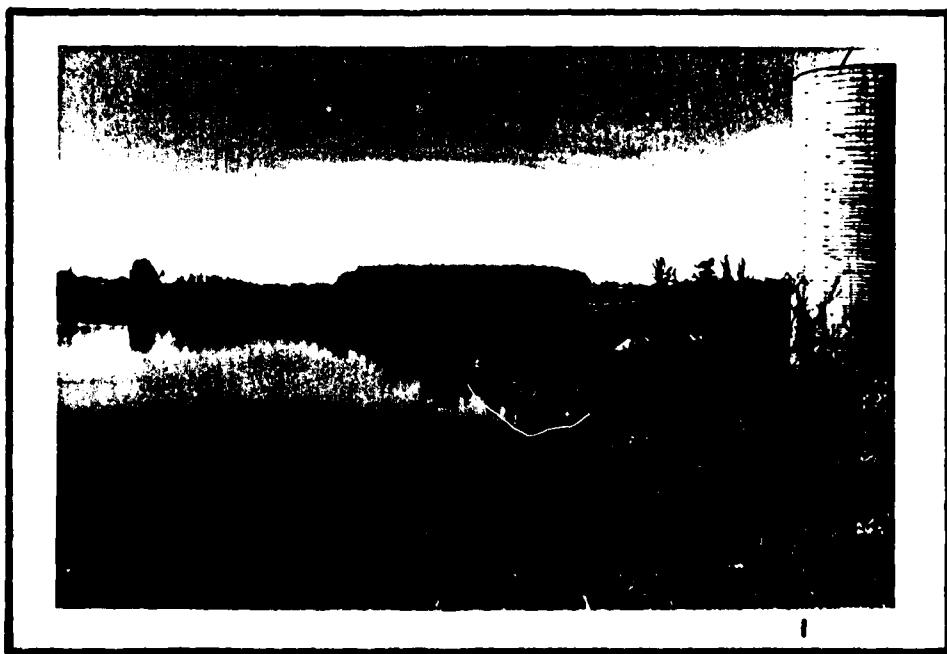


OVERVIEW RIGHT END OF EMBANKMENT - NO. 2



OVERVIEW SPILLWAY FOREBAY - NO. 3  
NOTE: BARBED WIRE FENCE

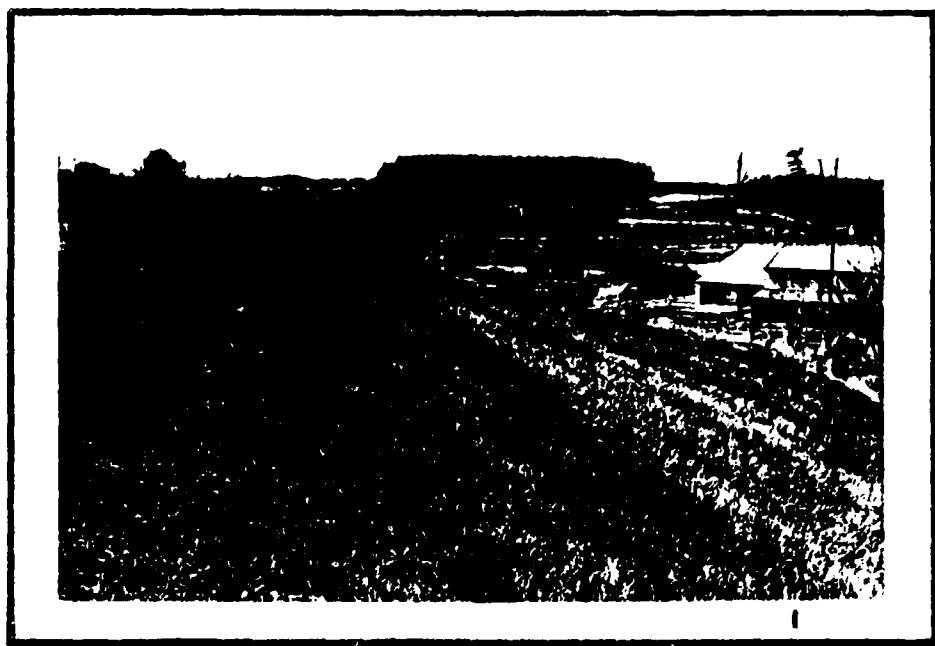
PA-01101  
Plate C-II



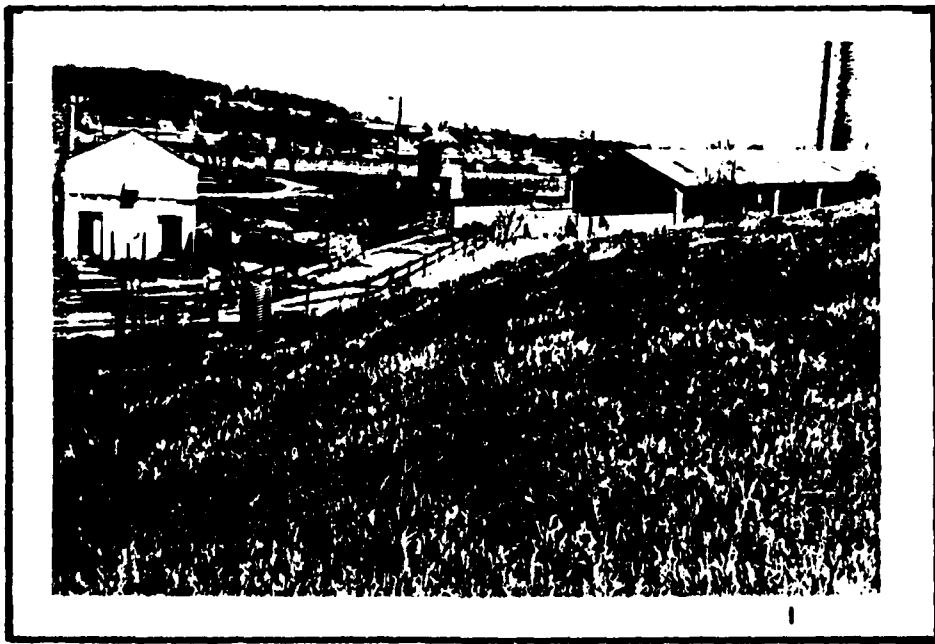
UPSTREAM SLOPE AT RIGHT END - NO. 4



UPSTREAM SLOPE - NO. 5  
NOTE: WEEDS, BRUSH AND EROSION FROM WAVE ACTION



DOWNSTREAM SLOPE - NO. 6

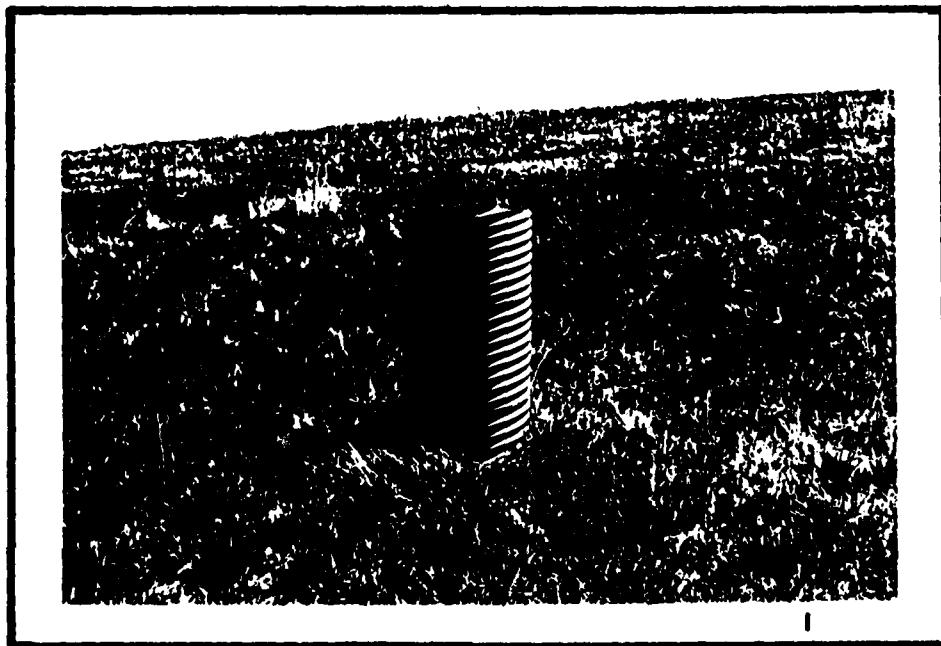


DOWNSTREAM SLOPE - NO. 7  
NOTE: OBSERVATION WELL AND BARNs

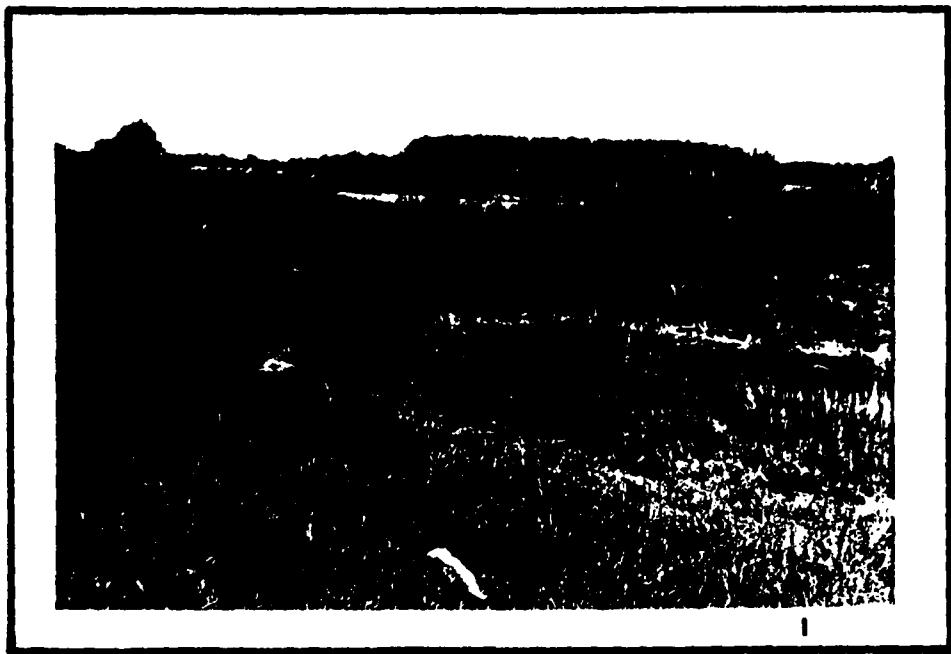
PA-01101  
Plate C-IV



DOWNSTREAM SLOPE AND VIEW OF LAGOONS - NO. 8



OBSERVATION WELL OF SUBSURFACE DRAINAGE - NO. 9



SPILLWAY FOREBAY AREA - NO. 10



INLET OF 12-INCH CMP PRINCIPAL SPILLWAY - NO. 11



SPILLWAY DISCHARGE CHANNEL - NO. 12



OVERVIEW OF RESERVOIR - NO. 13

PA-01101  
Plate C-VII

APPENDIX D  
HYDROLOGY AND HYDRAULIC CALCULATIONS

APPENDIX D

SUMMARY DESCRIPTION  
OF  
FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION

The hydrologic and hydraulic evaluation for this inspection report has employed computer techniques using the Corps of Engineers computer program identified as the Flood Hydrograph Package (HEC-1) Dam Safety Version.

The program has been designed to enable the user to perform two basic types of hydrologic analyses: (1) the evaluation of the overtopping potential of the dam, and (2) the capability to estimate the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. A brief summary of the computation procedures typically used in the dam overtopping analysis is shown below.

- Development of an inflow hydrograph to the reservoir.
- Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- Routing of the outflow hydrograph(s) of the reservoir to desired downstream locations. The results provide the peak discharge and maximum stage of each routed hydrograph at the outlet of the reach.

The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

The results of the studies conducted for this report are presented in Section 5.

For detailed information regarding this program refer to the Users Manual for the Flood Hydrograph Package (HEC-1) Dam Safety Version prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California.

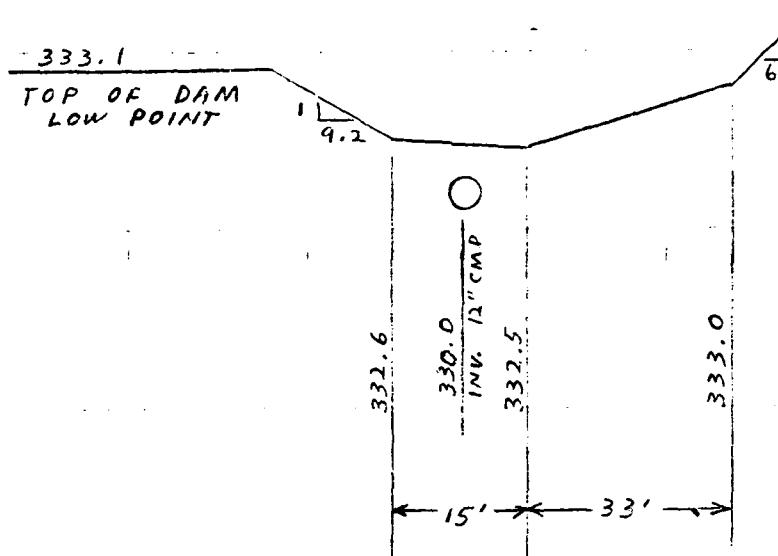
BY RLS DATE 4/19/81  
CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

GREEN VALLEY FARM DAM

SHEET NO. 1 OF 8  
PROJECT 00590

SPILLWAY RATING



$$\text{ORIFICE: } Q = C A \sqrt{2gH}$$

$$H = 333.1 - 330.5 = 2.6'$$

$$Q = 0.6 \times \pi \times 1/4 \times (2 \times 32.2 \times 2.6)^{0.5}$$

$$= 6 \text{ CFS}$$

$$\text{SWALE: } Q = C (L_1 H_1^{3/2} + L_2 H_2^{3/2} + L_3 H_3^{3/2} + L_4 H_4^{3/2})$$

$$L_1 = 9.2 \times (333.1 - 332.6) = 4.6'$$

$$L_2 = 15'$$

$$L_3 = 33'$$

$$L_4 = 6.1 \times (333.1 - 333.0) = .6'$$

$$H_1 = (333.1 - 332.6)/2 = .25'$$

$$H_2 = 333.1 - ((332.6 + 332.5)/2) = .55'$$

$$H_3 = 333.1 - ((332.5 + 333.0)/2) = .35'$$

$$H_4 = (333.1 - 333.0)/2 = .05'$$

$$Q = 2.7 ((4.6 \times (.25)^{1.5}) + (15 \times (.55)^{1.5}) + (33 \times (.35)^{1.5}) + (.6 \times (.05)^{1.5}))$$

$$= 36.5 \text{ SAY } 37 \text{ CFS}$$

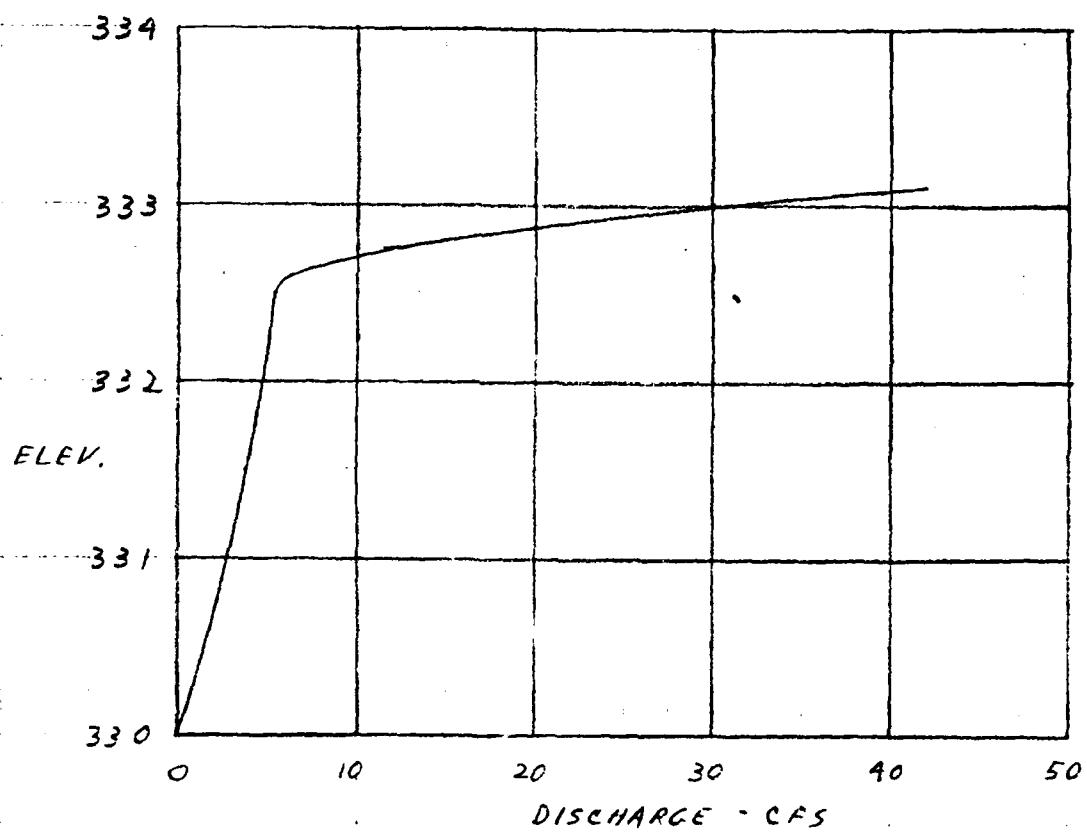
BY RLS DATE 4/19/81  
CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

SHEET NO. 2 OF 8  
PROJECT 00590

GREEN VALLEY FARM DAM

SPILLWAY RATING CURVE



BY RLS DATE 4/14/81  
CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

SHEET NO. 3 OF 8  
PROJECT D0590

GREEN VALLEY FARM DAM

DISCHARGE THROUGH OUTLET WORKS

4" DIA PIPE

C = 0.6 (KINGS HOLE)

INVERT = 309.4 ±

$$Q = CA \sqrt{2gH}$$

AT POOL ELEV 330

$$H = 330 - 309.65 = 20.35$$

$$Q = 0.6 \times \pi \times \frac{(25)^2}{4} \times (2 \times 32.2 \times 20.35)^{0.5}$$
$$= 1.1 \text{ CFS}$$

AT LOW POOL ELEV 315

$$H = 315 - 309.65 = 5.35$$

$$Q = 0.6 \times \pi \times \frac{(25)^2}{4} \times (2 \times 32.2 \times 5.35)^{0.5}$$
$$= .5 \text{ CFS}$$

BY BLS. DATE 7/14/81  
CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

SHEET NO. 4 OF 8  
PROJECT DO590

GREEN VALLEY FARM DAM

EMBANKMENT RATING

$$Q = CLH^{3/2}$$

$$C = 2.7 \text{ (KINGS HDBK)}$$

AT ELEV 333.5

$$2.7 \times 50 \times (2)^{3/2} = 12$$

$$2.7 \times 50 \times (4)^{3/2} = 39$$

$$2.7 \times 50 \times (35)^{3/2} = 28$$

$$2.7 \times 50 \times (3)^{3/2} = 22$$

$$2.7 \times 100 \times (35)^{3/2} = 56$$

$$2.7 \times 30 \times (15)^{3/2} = 5$$

$$\Sigma = 157 \text{ CFS}$$

AT ELEV 334

$$2.7 \times 42 \times (25)^{3/2} = 14$$

$$2.7 \times 50 \times (7)^{3/2} = 79$$

$$2.7 \times 50 \times (85)^{3/2} = 106$$

$$2.7 \times 50 \times (8)^{3/2} = 97$$

$$2.7 \times 100 \times (85)^{3/2} = 212$$

$$2.7 \times 50 \times (55)^{3/2} = 55$$

$$2.7 \times 50 \times (2)^{3/2} = 12$$

$$2.7 \times 25 \times (05)^{3/2} = 1$$

$$2.7 \times 25 \times (15)^{3/2} = 4$$

$$2.7 \times 25 \times (2)^{3/2} = 6$$

$$2.7 \times 25 \times (25)^{3/2} = 8$$

$$2.7 \times 25 \times (2)^{3/2} = 6$$

$$2.7 \times 23 \times (11)^{3/2} = 2$$

$$2.7 \times 50 \times (9)^{3/2} = 115$$

$$\Sigma = 717 \text{ CFS}$$

AT ELEV 334.5

$$\Sigma = 1802 \text{ CFS}$$

BY RLS DATE 4/14/81  
CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

GREEN VALLEY FARM

SHEET NO. 5 OF 8  
PROJECT D0590

MAXIMUM KNOWN FLOOD AT DAMSITE

THERE ARE NO RECORDS OF FLOOD LEVELS AT THIS DAM. BASED ON THE RECORDS OF THE STREAM GAGING STATION ON MIDDLE BRANCH WHITE CLAY CREEK AT NEARBY LANDENBERG, PA, (D.A. = 12.7 SQ.MI.) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JUNE 1972 WHEN A DISCHARGE OF 3860 CFS WAS RECORDED. THE MAXIMUM INFLOW TO GREEN VALLEY FARM DAM IS ESTIMATED TO BE

$$\left(\frac{.21}{12.7}\right)^{0.5} \times 3860 = 145 \text{ CFS}$$

DESIGN FLOOD

SIZE CLASSIFICATION

MAXIMUM STORAGE = 80 ACRE-FEET

MAXIMUM HEIGHT = 23 FEET

SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION :

ONE HOUSE AND ONE INDUSTRY LOCATED

NEAR THE DOWNSTREAM CHANNEL

USE "HIGH"

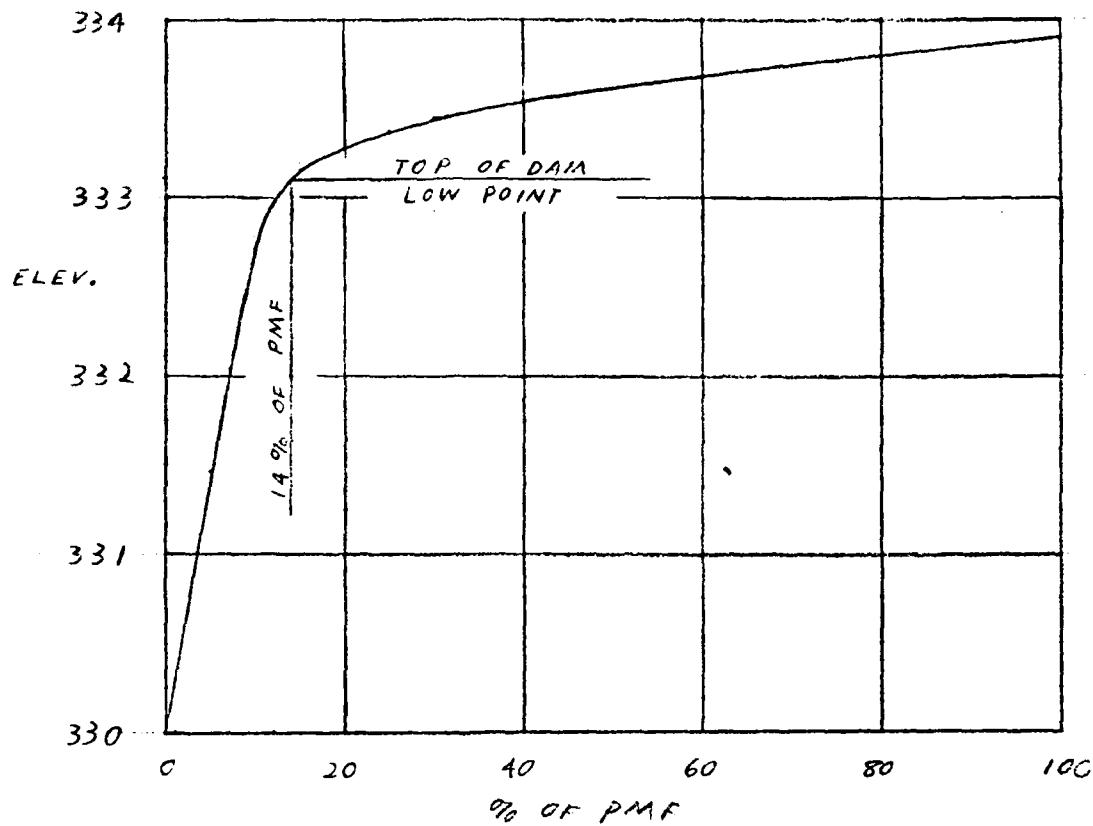
BY QLS DATE 4/21/81  
CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

SHEET NO. 6 OF 8  
PROJECT DO590

GREEN VALLEY FARM DAM

SPILLWAY CAPACITY CURVE



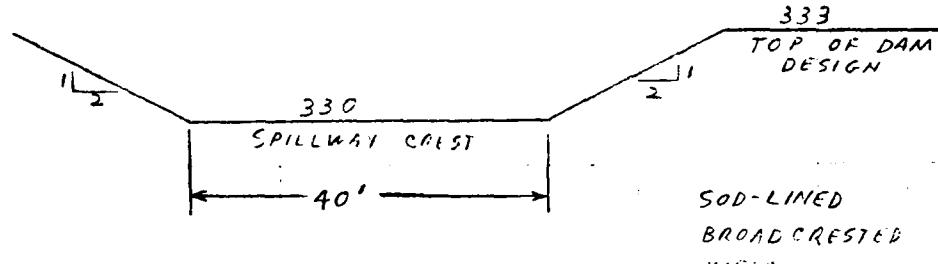
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CHKD. BY DATE  
SUBJECT

BERGER ASSOCIATES

SHEET NO. 7 OF 8  
PROJECT DO 590

GREEN VALLEY FARM

SPILLWAY RATING (DESIGN)



SOD-LINED  
BROAD CRESTED  
WEIR

$C = 2.7$  (KHIG'S HOBK)

$$Q = C L_1 H_1^{3/2} + C L_2 H_2^{3/2} + C L_3 H_3^{3/2}$$

$$L_1 = 2 \times 3 = 6'$$

$$L_2 = 40'$$

$$L_3 = 2 \times 3 = 6'$$

$$H_1 = (333 - 330)/2 = 1.5'$$

$$H_2 = 333 - 330 = 3'$$

$$H_3 = (333 - 330)/2 = 1.5'$$

$$Q = 2.7 \times 6 \times (1.5)^{1.5} + 2.7 \times 40 \times (3)^{1.5} + 2.7 \times 6 \times (1.5)^{1.5}$$

$$= 621 \text{ CFS}$$

BY RLS DATE 5/4/81  
CHKD. BY DATE  
SUBJECT

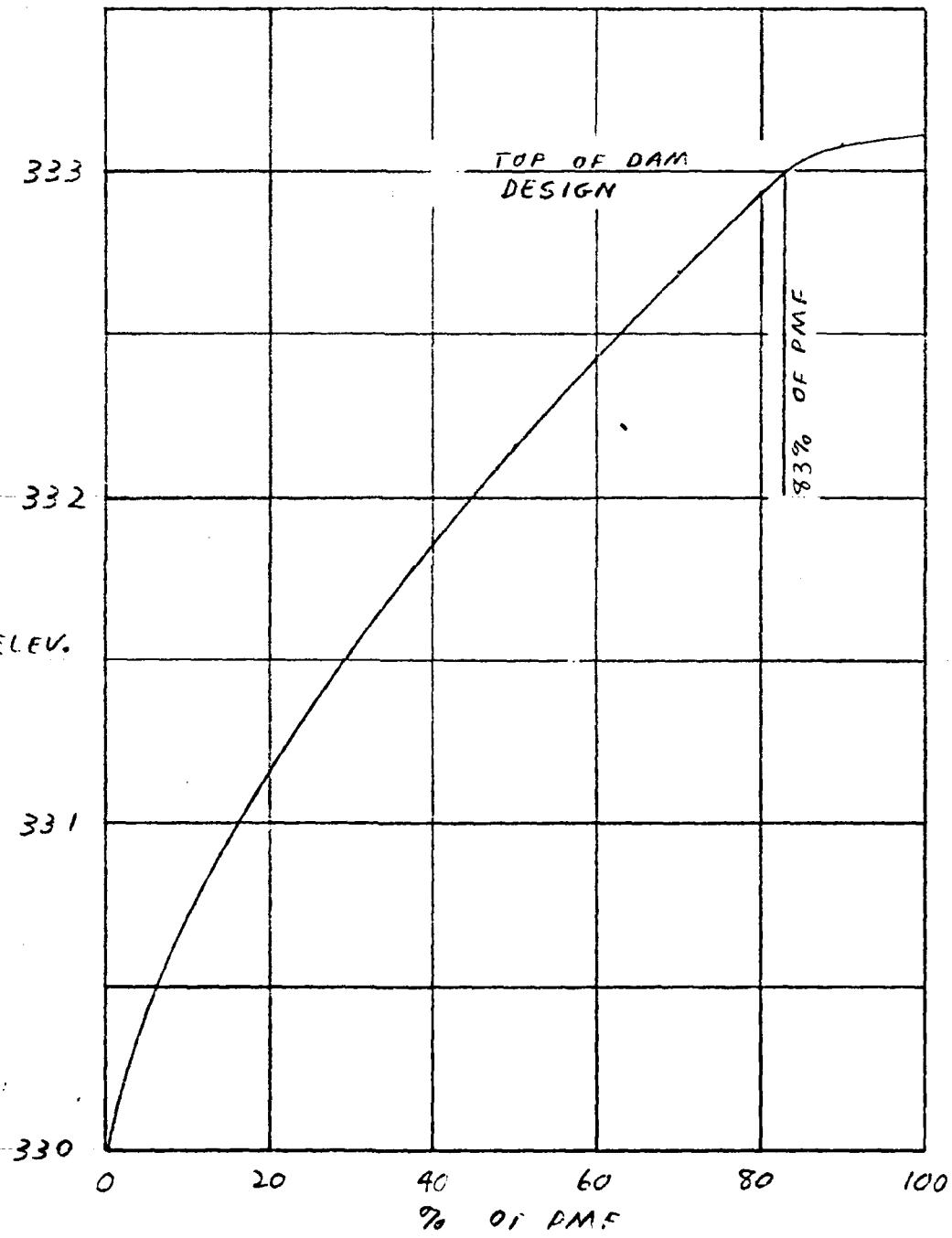
BERGER ASSOCIATES

SHEET NO. 8 OF 8  
PROJECT 00590

GREEN VALLEY

SPILLWAY CAPACITY CURVE

(DESIGN)



# HYDROLOGY AND HYDRAULIC ANALYSIS DATA BASE

NAME OF DAM: Green Valley Farms Dam RIVER BASIN: Delaware  
PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.5 INCHES/24 HOURS<sup>(1)</sup>

(FOR FOOTNOTES SEE NEXT PAGE)

| STATION  | 1  | 2   | 3  | 4 |
|--|--|---|--|---|
| STATION DESCRIPTION  | GREEN VALLEY<br>DAM  |   |  |   |
| DRAINAGE AREA (SQUARE MILES)                                 | .21  |   |  |   |
| CUMULATIVE DRAINAGE AREA<br>(SQUARE MILE)                    | .21  |   |  |   |
| ADJUSTMENT<br>OF PMP FOR<br>DRAINAGE AREA (%) <sup>(2)</sup> | 6 HOURS<br>12 HOURS<br>24 HOURS<br>48 HOURS<br>72 HOURS<br>Zone 6  | 113<br>123<br>132<br>143                      |  |   |
| SNYDER HYDROGRAPH<br>PARAMETERS                              | ZONE <sup>(3)</sup><br>$C_p/C_t$ <sup>(4)</sup><br>$L$ (MILES) <sup>(5)</sup><br>$L_{ca}$ (MILES) <sup>(5)</sup><br>$T_p = C_t (L \cdot L_{ca})^{0.3}$ (Hours)   | 10<br>.60/1.25<br>.80<br>.44<br>.91           |  |   |
| SPILLWAY DATA  | CREST LENGTH (FT.)<br>FREEBOARD (FT.)<br>DISCHARGE COEFFICIENT<br>EXPONENT<br>ELEVATION  | PIPE<br>1' diameter<br>3.1<br>.6<br>--<br>330 | SWALE<br>48<br>.6<br>2.7<br>1.5<br>332.5 |   |
| AREA <sup>(6)</sup><br>(ACRES)                               | NORMAL POOL<br>ELEV. <u>330</u><br>ELEV. <u>340</u>  | 7.3<br>12.9                                   |  |   |
| STORAGE<br>(ACRE - FEET)                                     | NORMAL POOL <sup>(7)</sup><br>ELEV. 330<br>ELEV. <u>307.4</u> <sup>(8)</sup><br>ELEV. <u>          </u> <sup>(8)</sup><br>ELEV. <u>          </u> <sup>(8)</sup> | 55<br>0                                       |  |   |

- (1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.
- (2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.
- (3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients ( $C_p$  and  $C_t$ ).
- (4) Snyder's Coefficients.
- (5)  $L$  = Length of longest water course from outlet to basin divide.  
 $L_{ca}$  = Length of water course from outlet to point opposite the centroid of drainage area.
- (6) Planimetered area encompassed by contour upstream of dam.
- (7) PennDER files.
- (8) Computed by conic method.

\*\*\*\*\*  
FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 01 APR 80  
\*\*\*\*\*

OVERTOPPING  
ANALYSIS  
(EXISTING CONDITIONS)

1 A1 GREEN VALLEY FARM DAM \*\*\*\* TROUT RUN  
2 A2 NEW GARDEN TWP., CHESTER COUNTY, PA.  
3 A3 NDI # PA-01101 PA DER # 15-307  
4 B 300 0 15 0 0 0 0 0 -4 0  
5 B1 5  
6 J 1 9 1  
7 J1 1 .8 .6 .5 .4 .25 .1 .05 .01  
8 K 1  
9 K1 INFLOW HYDROGRAPH  
10 M 1 1 .21  
11 P 23.5 113 123 132 143  
12 T 1 .05  
13 W .91 .60  
14 X -1.5 -.05 2  
15 K 1 2 1  
16 K1 RESERVOIR ROUTING  
17 Y 1  
18 Y1 1  
19 Y4 330 331 331.5 332.5 333.1 333.5 334 334.5  
20 Y5 0 3 4 5.5 42 267 946 2187  
21 \$A 0 7.3 12.9  
22 \$E 307.4 330 340  
23 \$\$ 330  
24 \$D 333.1  
25 K 99

1 PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT 1  
ROUTE HYDROGRAPH TO 2  
END OF NETWORK

\*\*\*\*\*  
FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 01 APR 80  
\*\*\*\*\*

RUN DATE\* 81/05/27,  
TIME\* 12.55.31.

GREEN VALLEY FARM DAM \*\*\*\* TROUT RUN  
NEW GARDEN TWP., CHESTER COUNTY, PA.  
NDI # PA-01101 PA DER # 15-307

JOB SPECIFICATION

| NQ  | NHR | NMIN | IDAY | IHR   | IMIN | METRC | IPLT  | IPRT | INSTN |
|-----|-----|------|------|-------|------|-------|-------|------|-------|
| 300 | 0   | 15   | 0    | 0     | 0    | 0     | 0     | -4   | 0     |
|     |     |      |      | JOPER | NWT  | LCOPT | TRACE |      |       |
|     |     |      |      | 5     | 0    | 0     | 0     |      |       |

MULTI-PLAN ANALYSES TO BE PERFORMED

NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS= 1.00 .80 .60 .50 .40 .25 .10 .05 .01

2

### SUB-AREA RUNOFF COMPUTATION

### INFLOW HYDROGRAPH

|       |       |       |       |      |      |        |        |       |
|-------|-------|-------|-------|------|------|--------|--------|-------|
| ISTAQ | ICOMP | IECON | ITAPE | JPLT | JPRT | I NAME | ISTAGE | IAUTO |
| 1     | 0     | 0     | 0     | 0    | 0    | 1      | 0      | C     |

| HYDROGRAPH DATA |      |       |      |       |       |       |       |       |       |  |  |
|-----------------|------|-------|------|-------|-------|-------|-------|-------|-------|--|--|
| IHYDG           | IUHG | TAREA | SNAP | TRSDA | TRSPC | RATIO | ISNOW | ISAME | LOCAL |  |  |
| 1               | 1    | .21   | 0.00 | .21   | 0.00  | 0.000 | 0     | 0     | 0     |  |  |

PRECIP DATA

TREPC COMPUTED BY THE PROGRAM IS .800

**LOSS DATA**

| LRCPT | STRKR | DLTKR | RTIOL | ERAIN | STRKS | RTIOK | STRTL | CKSTL | ALSMX | RTIMP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0     | 0.00  | 0.00  | 1.00  | 0.00  | 0.60  | 1.00  | 1.00  | .05   | 0.00  | 0.00  |

#### UNIT HYDROGRAPH DATA

TP= .91 CP= .60 NTA= 0

### RECESSION DATA

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG=.91 HOURS, CP=.60 VOL=1.00  
 11. 40. 72. 88. 79. 60. 46. 35. 27. 20.  
 15. 12. 9. 7. 5. 4. 3. 2. 2. 1.  
 1. 1.

0  
MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q  
SUM 26.88 24.47 2.42 13448.  
( 633.)( 621.)( 61.)( 330.80)

## HYDROGRAPH ROUTING

## RESERVOIR ROUTING

|               | ISTAO<br>2     | ICOMP<br>1     | IECON<br>0  | ITAPE<br>0     | JPLT<br>0   | JFRT<br>0    | I NAME<br>1  | I STAGE<br>0 | I AUTO<br>0 |
|---------------|----------------|----------------|-------------|----------------|-------------|--------------|--------------|--------------|-------------|
|               | ROUTING DATA   |                |             |                |             |              |              |              |             |
|               | GLOSS<br>0.0   | CLOSS<br>0.000 | Avg<br>0.00 | IRES<br>1      | ISAME<br>0  | ICPT<br>0    | IPMP<br>0    | LSTR<br>0    |             |
|               | NSTPS<br>1     | NSTDL<br>0     | LAG<br>0    | AMSKK<br>0.000 | X<br>0.000  | TSK<br>0.000 | STORA<br>55. | ISPRAT<br>-1 |             |
| STAGE         | 330.00         | 331.00         | 331.50      | 332.50         | 333.10      | 333.50       | 334.00       | 334.50       |             |
| FLOW          | 0.00           | 3.00           | 4.00        | 5.50           | 42.00       | 267.00       | 946.00       | 2167.00      |             |
| SURFACE AREA= | 0.             | 7.             | 13.         |                |             |              |              |              |             |
| CAPACITY=     | 0.             | 55.            | 155.        |                |             |              |              |              |             |
| ELEVATION=    | 307.           | 330.           | 340.        |                |             |              |              |              |             |
|               | CREL<br>330.0  | SPWID<br>0.0   | COQW<br>0.0 | EXPW<br>0.0    | ELEV<br>0.0 | COQL<br>0.0  | CAREA<br>0.0 | EXPL<br>0.0  |             |
|               | DAM DATA       |                |             |                |             |              |              |              |             |
|               | TOPEL<br>333.1 | COQD<br>0.0    | EXPD<br>0.0 | DAMWID<br>0.   |             |              |              |              |             |

PEAK OUTFLOW IS 804. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 644. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 463. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 403. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 322. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 195. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 18. AT TIME 43.25 HOURS

PEAK OUTFLOW IS 4. AT TIME 44.25 HOURS

PEAK OUTFLOW IS 1. AT TIME 44.00 HOURS

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1

## PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

FLOWS IN CUBIC FEET PER SECOND (CUSIC METERS PER SECOND)

AREA IN SQUARE MILES (SQUARE KILOMETERS)

| OPERATION     | STATION | AREA  | RATIOS APPLIED TO FLOWS |         |         |         |         |         |         |         |         |         |
|---------------|---------|-------|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|               |         |       | PLAN                    | RATIO 1 | RATIO 2 | RATIO 3 | RATIO 4 | RATIO 5 | RATIO 6 | RATIO 7 | RATIO 8 | RATIO 9 |
|               |         |       |                         | 1.00    | .80     | .60     | .50     | .40     | .25     | .10     | .05     | .01     |
| HYDROGRAPH AT | 1       | .21   | 1                       | 821.    | 657.    | 493.    | 411.    | 329.    | 205.    | 82.     | 41.     | 8.      |
|               | (       | (.54) | (                       | 23.26)  | (18.61) | (13.95) | (11.63) | (9.30)  | (5.81)  | (2.33)  | (1.16)  | (.23)   |
| ROUTED TO     | 2       | .21   | 1                       | 804.    | 644.    | 483.    | 403.    | 322.    | 195.    | 18.     | 4.      | 1.      |
|               | (       | (.54) | (                       | 22.73)  | (18.22) | (13.67) | (11.41) | (9.13)  | (5.52)  | (.52)   | (.11)   | (.03)   |

1

## SUMMARY OF DAM SAFETY ANALYSIS

| PLAN 1 ..... | INITIAL VALUE    | SPILLWAY CREST | TOP OF DAM |
|--------------|------------------|----------------|------------|
|              | ELEVATION 330.00 | 330.00         | 333.10     |
|              | STORAGE 55.      | 55.            | 80.        |
|              | OUTFLOW 0.       | 0.             | 42.        |

| RATIO OF PMF | MAXIMUM RESERVOIR W.S.ELEV | MAXIMUM DEPTH OVER DAM | MAXIMUM STORAGE AC-FT | MAXIMUM CUTOFF CFS | DURATION OVER TOP HOURS | TIME OF MAX OUTFLOW HOURS | TIME OF FAILURE HOURS |
|--------------|----------------------------|------------------------|-----------------------|--------------------|-------------------------|---------------------------|-----------------------|
| 1.00         | 333.90                     | .80                    | 87.                   | 304.               | 8.00                    | 40.50                     | 0.00                  |
| .80          | 333.78                     | .68                    | 86.                   | 644.               | 7.50                    | 40.50                     | 0.00                  |
| .60          | 333.66                     | .56                    | 85.                   | 483.               | 6.50                    | 40.50                     | 0.00                  |
| .50          | 333.60                     | .50                    | 85.                   | 403.               | 6.00                    | 40.50                     | 0.00                  |
| .40          | 333.54                     | .44                    | 84.                   | 322.               | 5.00                    | 40.50                     | 0.00                  |
| .25          | 333.37                     | .27                    | 82.                   | 195.               | 3.50                    | 40.75                     | 0.00                  |
| .10          | 332.71                     | 0.00                   | 77.                   | 18.                | 0.00                    | 43.25                     | 0.00                  |
| .05          | 331.46                     | 0.00                   | 66.                   | 4.                 | 0.00                    | 44.25                     | 0.00                  |
| .01          | 330.30                     | 0.00                   | 57.                   | 1.                 | 0.00                    | 44.00                     | 0.00                  |

EOI ENCOUNTERED.  
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FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 01 APR 80  
\*\*\*\*\*

OVERTOPPING  
ANALYSIS  
(DESIGN CONDITION)

5

1 A1 GREEN VALLEY FARM DAM \*\*\*\* TROUT RUN  
2 A2 NEW GARDEN TWP., CHESTER COUNTY, PA.  
3 A3 NDI # PA-XXXXX PA DER # 15-307  
4 B 300 0 15 0 0 0 0 0 -4 0  
5 B1 5  
6 J 1 9 1  
7 J1 1 .9 .8 .7 .6 .5 .4 .3 .15  
8 K 1  
9 K1 INFLOW HYDROGRAPH  
10 M 1 1 .21  
11 P 23.5 113 123 132 143  
12 T 1 .05  
13 W .91 .60  
14 X -1.5 -.05 2  
15 K 1 2  
16 K1 RESERVOIR ROUTING  
17 Y 1  
18 Y1 1  
19 Y4 330 330.5 331 331.5 332 332.5 333 333.5 334  
20 Y5 0 39 112 209 321 465 621 1471 2950  
21 \$A 0 7.3 12.9  
22 \$E 307.4 330 340  
23 \$\$ 330  
24 \$D 333.0  
25 K 99

1 PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT 1  
ROUTE HYDROGRAPH TO 2  
END OF NETWORK

\*\*\*\*\*  
FLOOD HYDROGRAPH PACKAGE (HEC-1)  
DAM SAFETY VERSION JULY 1978  
LAST MODIFICATION 01 APR 80  
\*\*\*\*\*

RUN DATE\* 81/04/24.  
TIME\* 08.20.32.

GREEN VALLEY FARM DAM \*\*\*\* TROUT RUN  
NEW GARDEN TWP., CHESTER COUNTY, PA.  
NDI # PA-XXXXX PA DER # 15-307

JOB SPECIFICATION

| NQ  | NHR | NMIN | IDAY  | IHR | IMIN  | METRC | IPLT | IPRT | NSTAN |
|-----|-----|------|-------|-----|-------|-------|------|------|-------|
| 300 | 0   | 15   | 0     | 0   | 0     | 0     | 0    | -4   | 0     |
|     |     |      | JOPER | NWT | LROPT | TRACE |      |      |       |
|     |     |      | 5     | 0   | 0     | 0     |      |      |       |

MULTI-PLAN ANALYSES TO BE PERFORMED

NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOs= 1.00 .90 .80 .70 .60 .50 .40 .30 .15

## SUB-AREA RUNOFF COMPUTATION 6

## INFLOW HYDROGRAPH

| ISTAQ | ICOMP | IECON | ITAPE | JPLT | JPRT | I NAME | ISTAGE | IAUTO |
|-------|-------|-------|-------|------|------|--------|--------|-------|
| 1     | 0     | 0     | 0     | 0    | 0    | 1      | 0      | 0     |

| HYDROGRAPH DATA |      |       |      |       |       |       |       |       |       |
|-----------------|------|-------|------|-------|-------|-------|-------|-------|-------|
| IHYDG           | IUNG | TAREA | SNAP | TRSDA | TRSPC | RATIO | ISNOW | ISAME | LOCAL |
| 1               | 1    | .21   | 0.00 | .21   | 0.00  | 0.000 | 0     | 0     | 0     |

| PRECIP DATA |       |        |        |        |        |      |      |
|-------------|-------|--------|--------|--------|--------|------|------|
| SPFE        | PMS   | R6     | R12    | R24    | R48    | R72  | R96  |
| 0.00        | 23.50 | 113.00 | 123.00 | 132.00 | 143.00 | 0.00 | 0.00 |

TRSPC COMPUTED BY THE PROGRAM IS .600

| LOSS DATA |       |       |       |       |       |       |       |       |       |       |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| LROPT     | STRKR | DLTKR | RTIOL | ERAIN | STRKS | RTIOK | STRTL | CNSTL | ALSMX | RTIMP |
| 0         | 0.00  | 0.00  | 1.00  | 0.00  | 0.00  | 1.00  | 1.00  | .05   | 0.00  | 0.00  |

| UNIT HYDROGRAPH DATA |     |      |
|----------------------|-----|------|
| TP=                  | CP= | NTA= |
| .91                  | .60 | 0    |

| RECEDSION DATA |        |        |
|----------------|--------|--------|
| STRTO=         | GRCSN= | RTIOR= |
| -1.50          | -.05   | 2.00   |

| UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= .91 HOURS, CP= .60 VOL= 1.00 |     |     |     |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 11.   | 40. | 72. | 69. | 79. | 60. | 46. | 35. | 27. | 20. |
| 15.   | 12. | 9.  | 7.  | 5.  | 4.  | 3.  | 2.  | 2.  | 1.  |
| 1.  | 1.  |     |     |     |     |     |     |     |     |

| END-OF-PERIOD FLOW |       |        |      |      |      |        |       |       |        |      |      |      |        |
|--------------------|-------|--------|------|------|------|--------|-------|-------|--------|------|------|------|--------|
| MO.DA              | HR.MN | PERIOD | RAIN | EXCS | LOSS | COMP Q | MO.DA | HR.MN | PERIOD | RAIN | EXCS | LOSS | COMP Q |
|                    |       |        |      |      |      |        |       |       |        |      |      |      |        |

|                                  |       |       |      |        |
|----------------------------------|-------|-------|------|--------|
| SUM                              | 26.88 | 24.47 | 2.42 | 13448. |
| ( 683.) ( 621.) ( 61.) ( 380.80) |       |       |      |        |

## HYDROGRAPH ROUTING

## RESERVOIR ROUTING

|               | ISTAQ<br>2    | ICOMP<br>1   | IECON<br>0  | ITAPE<br>0  | JPLT<br>0   | JPRT<br>0   | I NAME<br>1  | I STAGE<br>0 | I AUTO<br>0 |
|---------------|---------------|--------------|-------------|-------------|-------------|-------------|--------------|--------------|-------------|
|               | ROUTING DATA  |              |             |             |             |             |              |              |             |
| QLOSS         | CLOSS         | Avg          | IRES        | ISAME       | ICPT        | IPMP        | LSTR         |              |             |
| 0.0           | 0.000         | 0.00         | 1           | 0           | 0           | 0           | 0            |              |             |
|               | NSTPS         | NSTDL        | LAG         | AMSKK       | X           | TSK         | STORA        | ISPRAT       |             |
|               | 1             | 0            | 0           | 0.000       | 0.000       | 0.000       | 55.          | -1           |             |
| STAGE         | 330.00        | 330.50       | 331.00      | 331.50      | 332.00      | 332.50      | 333.00       | 333.50       | 334.00      |
| FLOW          | 0.00          | 39.00        | 112.00      | 209.00      | 321.00      | 465.00      | 621.00       | 1471.00      | 2950.00     |
| SURFACE AREA= | 0.            | 7.           | 13.         |             |             |             |              |              |             |
| CAPACITY=     | 0.            | 55.          | 155.        |             |             |             |              |              |             |
| ELEVATION=    | 307.          | 330.         | 340.        |             |             |             |              |              |             |
|               | CREL<br>330.0 | SPWID<br>0.0 | COQW<br>0.0 | EXPW<br>0.0 | ELEV<br>0.0 | COQL<br>0.0 | CAREA<br>0.0 | EXPL<br>0.0  |             |

| DAM DATA |      |      |        |
|----------|------|------|--------|
| TOPEL    | COQD | EXPD | DAMWID |
| 333.0    | 0.0  | 0.0  | 0.     |

PEAK OUTFLOW IS 801. AT TIME 40.50 HOURS

PEAK OUTFLOW IS 751. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 600. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 523. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 445. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 367. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 290. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 215. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 103. AT TIME 41.00 HOURS

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8

1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUSIC FEET PER SECOND (CUBIC METERS PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

| OPERATION     | STATION | AREA  | PLAN | RATIOS APPLIED TO FLOWS |                |                |                |                |                |                |                |                |
|---------------|---------|-------|------|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|               |         |       |      | RATIO 1<br>1.00         | RATIO 2<br>.90 | RATIO 3<br>.80 | RATIO 4<br>.70 | RATIO 5<br>.60 | RATIO 6<br>.50 | RATIO 7<br>.40 | RATIO 8<br>.30 | RATIO 9<br>.15 |
| HYDROGRAPH AT | 1       | .21   | 1    | 821.                    | 739.           | 657.           | 575.           | 493.           | 411.           | 329.           | 246.           | 123.           |
|               | (       | (.54) | (    | 23.26)                  | (20.93)        | (18.61)        | (16.28)        | (13.95)        | (11.63)        | (9.30)         | (6.98)         | (3.49)         |
| ROUTED TO     | 2       | .21   | 1    | 801.                    | 751.           | 600.           | 523.           | 445.           | 367.           | 290.           | 215.           | 103.           |
|               | (       | (.54) | (    | 22.57)                  | (21.27)        | (16.93)        | (14.31)        | (12.59)        | (10.40)        | (8.21)         | (6.09)         | (2.91)         |

1

## SUMMARY OF DAM SAFETY ANALYSIS

| PLAN 1 ..... | INITIAL VALUE | SPILLWAY CREST | TOP OF DAM |
|--------------|---------------|----------------|------------|
| ELEVATION    | 330.00        | 330.00         | 333.00     |
| STORAGE      | 55.           | 55.            | 79.        |
| OUTFLOW      | 0.            | 0.             | 621.       |

| RATIO<br>OF<br>PMF | MAXIMUM<br>RESERVOIR<br>W.S.ELEV | MAXIMUM<br>DEPTH<br>OVER DAM | MAXIMUM<br>STORAGE<br>AC-FT | MAXIMUM<br>OUTFLOW<br>CFS | DURATION<br>OVER TOP<br>HOURS | TIME OF<br>MAX OUTFLOW<br>HOURS | TIME OF<br>FAILURE<br>HOURS |
|--------------------|----------------------------------|------------------------------|-----------------------------|---------------------------|-------------------------------|---------------------------------|-----------------------------|
| 1.00               | 333.11                           | .11                          | 80.                         | 801.                      | 1.00                          | 40.50                           | 0.00                        |
| .90                | 333.08                           | .08                          | 80.                         | 751.                      | .75                           | 40.75                           | 0.00                        |
| .80                | 332.93                           | 0.00                         | 79.                         | 600.                      | 0.00                          | 40.75                           | 0.00                        |
| .70                | 332.69                           | 0.00                         | 76.                         | 523.                      | 0.00                          | 40.75                           | 0.00                        |
| .60                | 332.43                           | 0.00                         | 74.                         | 445.                      | 0.00                          | 40.75                           | 0.00                        |
| .50                | 332.16                           | 0.00                         | 72.                         | 367.                      | 0.00                          | 41.00                           | 0.00                        |
| .40                | 331.86                           | 0.00                         | 69.                         | 290.                      | 0.00                          | 41.00                           | 0.00                        |
| .30                | 331.53                           | 0.00                         | 67.                         | 215.                      | 0.00                          | 41.00                           | 0.00                        |
| .15                | 330.94                           | 0.00                         | 62.                         | 103.                      | 0.00                          | 41.00                           | 0.00                        |

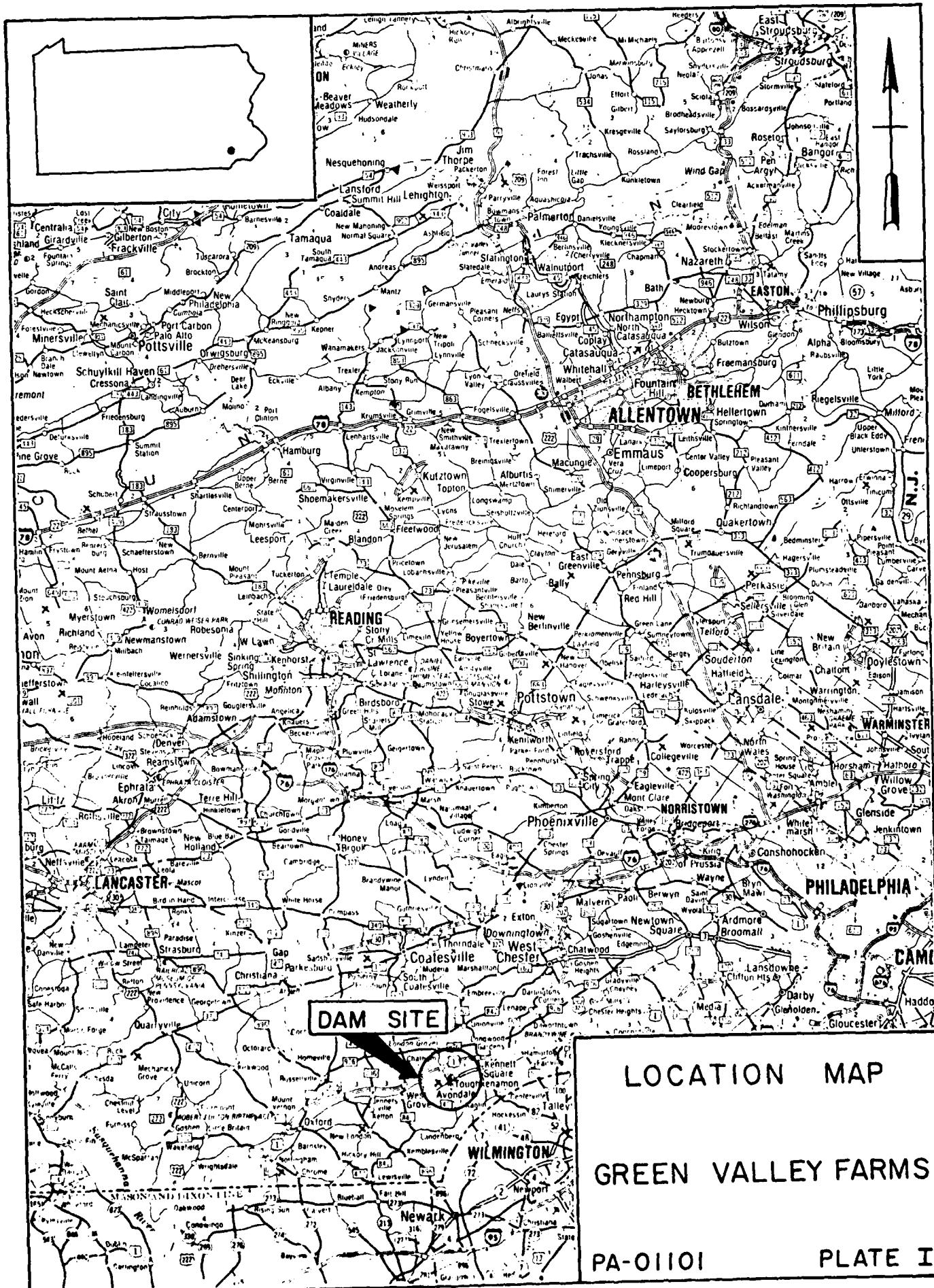
EOI ENCOUNTERED.

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**APPENDIX E**

**PLATES**

**APPENDIX E**

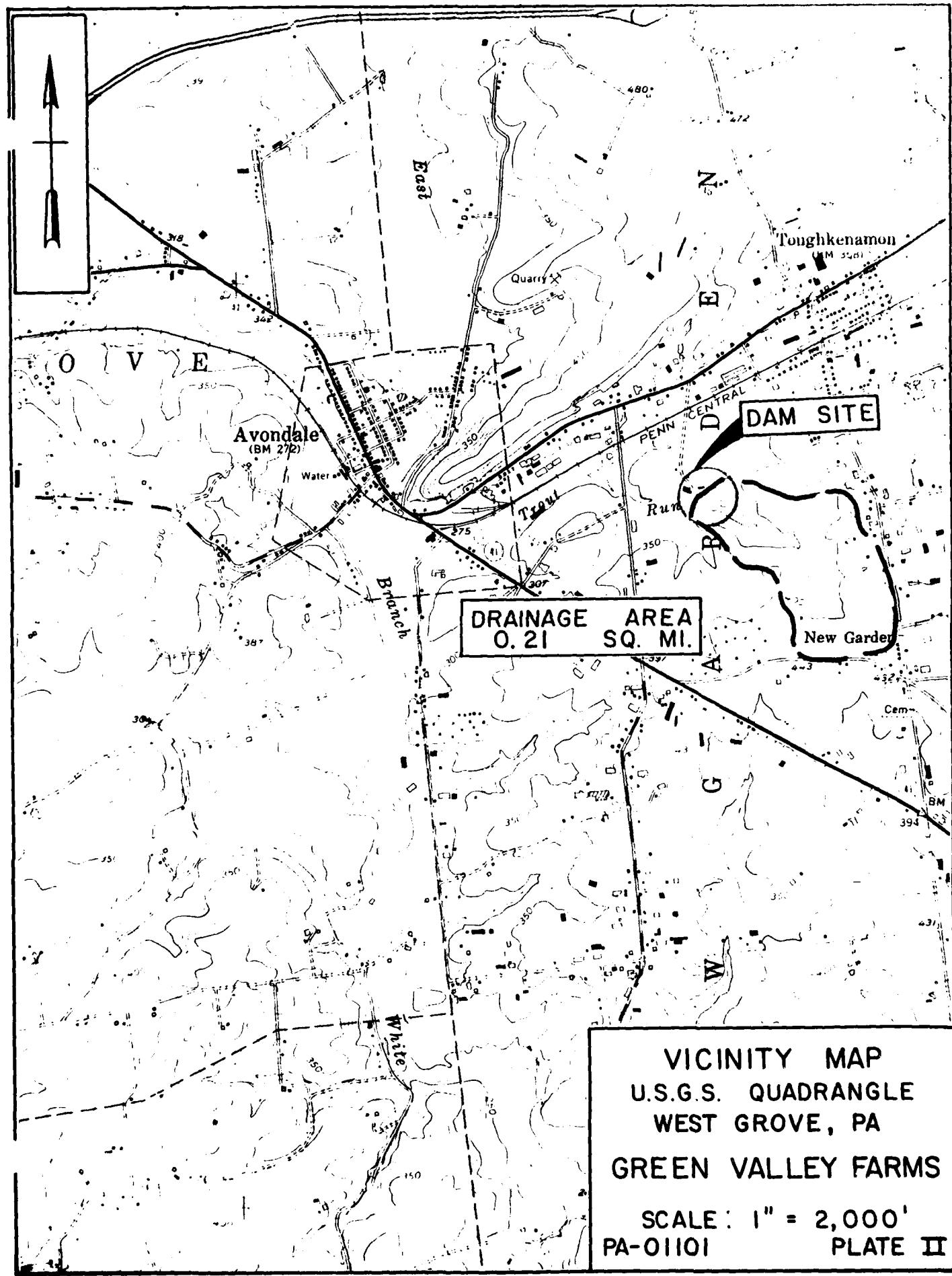


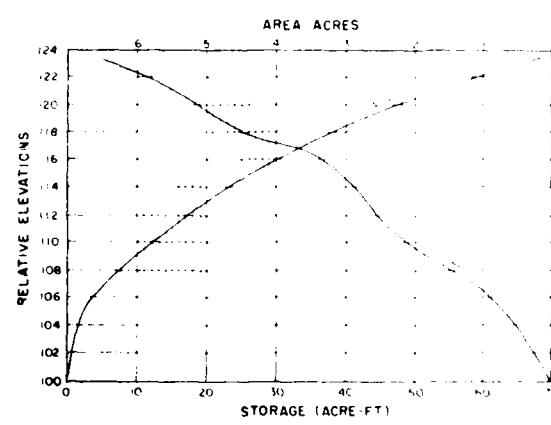
## LOCATION MAP

## GREEN VALLEY FARMS

PA-01101

PLATE I

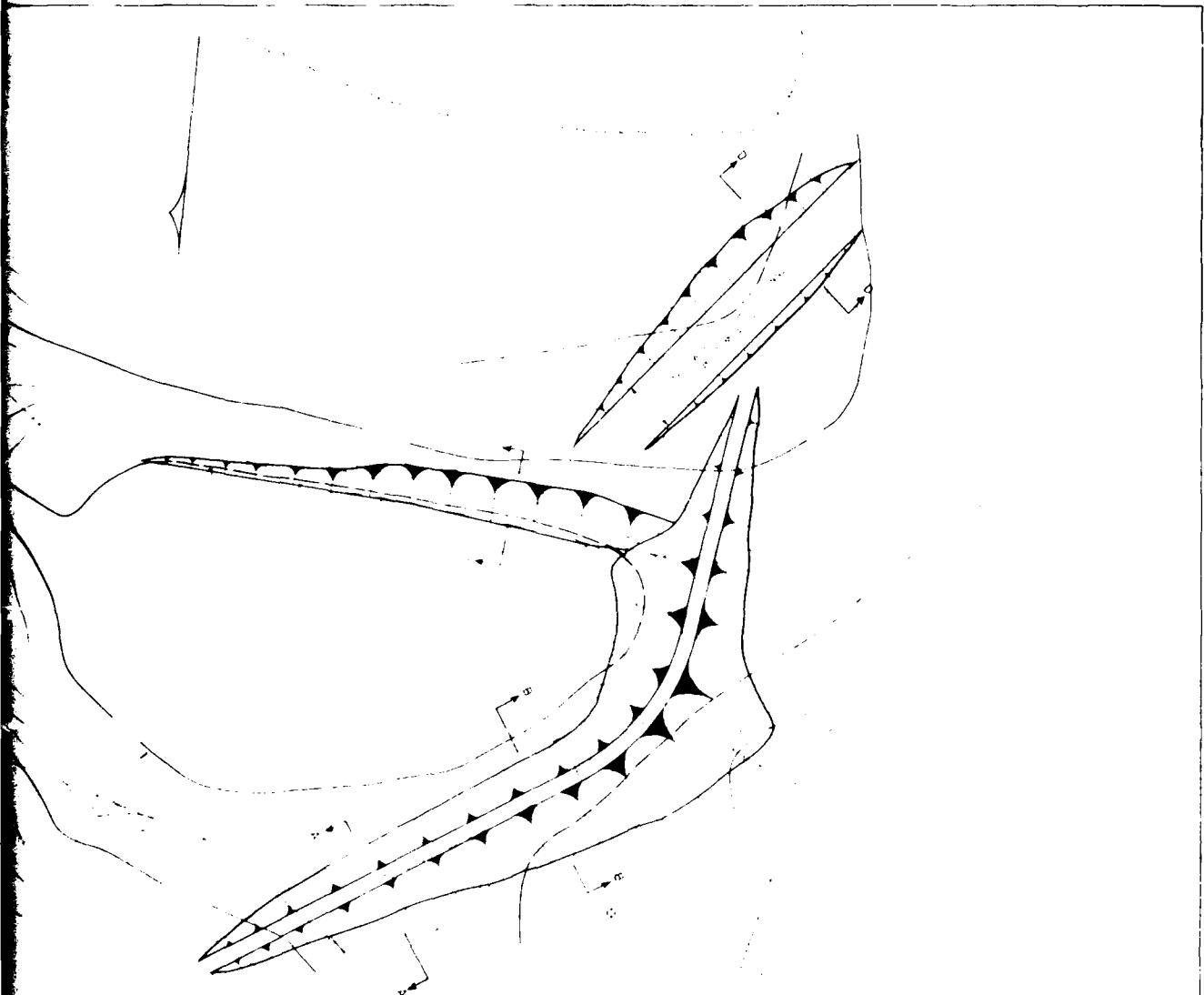




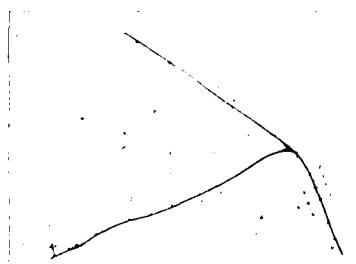
SECTION A-A  
SECTION C-C

SECTION B-B

SECTION D-D



PLAN



LOCATION MAP

NOTES

1. The plan is to be used in conjunction with the location map.  
2. The plan is to be used in conjunction with the location map.  
3. The plan is to be used in conjunction with the location map.  
4. The plan is to be used in conjunction with the location map.  
5. The plan is to be used in conjunction with the location map.  
6. The plan is to be used in conjunction with the location map.  
7. The plan is to be used in conjunction with the location map.  
8. The plan is to be used in conjunction with the location map.  
9. The plan is to be used in conjunction with the location map.  
10. The plan is to be used in conjunction with the location map.

PERTINENT DATA

1. Project Name: Green Valley Farms Irrigation Project  
2. Location: New Garden Twp, Chester Co., PA  
3. Date: 1963

GREEN VALLEY FARMS  
NEW GARDEN TWP CHESTER CO PA  
IRRIGATION PROJECT  
FARM POND PLAN AND PERTINENT DATA

PLATE III  
PA-01101

2  
Note: Toe drain has added to the

1963

**APPENDIX F**  
**GEOLOGIC REPORT**

**APPENDIX F**

## GEOLOGIC REPORT

### BEDROCK - DAM AND RESERVOIR

This area overlies the oligoclase-mica schist of the Wissahickon Formation. This schist consists of some hornblende gneiss members and some augen gneiss and quartz rich and feldspar rich members showing various degrees of granitization.

### STRUCTURE

Cleavage is highly abundant, well developed and has a platy pattern. Joints are present, usually irregular and poorly formed. Dip varies from 45-85°.

### OVERBURDEN

The overburden in this area is most probably a residual soil originating from the parent bedrock.

### AQUIFER CHARACTERISTICS

Like all schistose formations, the Wissahickon has a low secondary porosity. Subsurface seepage should be of little concern.

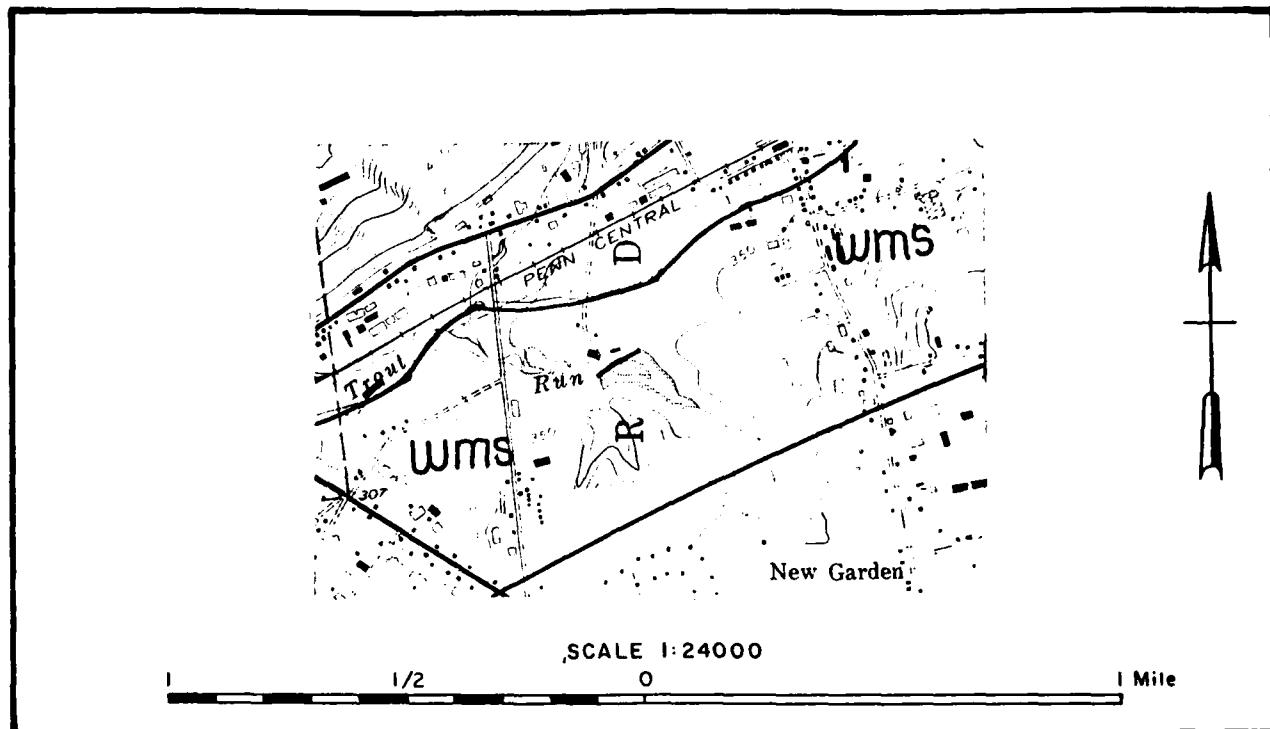
### DISCUSSION

There are no construction plans available to determine whether or not the cutoff trench of the dam was excavated to bedrock. However, the Wissahickon Formation provides a good quality foundation for heavy structures.

### SOURCES OF INFORMATION

1. Bascom, F., et. al., 1932. Coatesville-West Chester, Pennsylvania-Delaware Folio: U.S. Geological Survey F-223.
2. McGlade, W.G., 1972. Engineering Characteristics of the Rocks of Pennsylvania: Pennsylvania Geological Survey EG-1.

GEOLOGICAL MAP - GREEN VALLEY FARMS



LEGEND



Wissahickon Formation

DAT  
ILM